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SPECIAL CATALOGUE, No. I.

NESTS AND EGGS OF BIRDS

FOUND BREEDING

IN

AUSTRALIA AND TASMANIA,

BY

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ORNITHOLOGIST TO THE AUSTRALIAN MUSEUM.

(SECOND EDITION OF CATALOGUE No. XII., ENTIRELY RE-WRITTEN,
WITH ADDITIONS).

VOLUME II.

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R. Etheridge, Junr., J.P., Curator.*

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INTRODUCTION.

THE present and second Volume contains descriptions of the Nests and Eggs of one hundred and seventy-five species of Australian and Tasmanian Birds, and is partly based on the collections in the Australian Museum, and the remainder chiefly on private collections. The birds enumerated form the concluding portion of the Order PASSERES, and belong to the Families LANIIDE, CERTHIIDE, SITTIDE, MELIPHAGIDE, NECTARINIIDE, ZOSTEROPIDE, DICEIDE, PARDALOTIDE, HIRUNDINIIDE, ARTAMIDE, STURNIDE, PLOCEIDE, MOTACILLIDE, ALAUDIDE, PITTIDE and MENURIDE. It also includes the greater portion of the Order PICARLE, comprising the Families CAPRIMULGIDE, PODARGIDE, CORACIIDE, MEROPIDE, and ALCEDINIIDE.

By the loan of specimens and the contribution of information, considerable assistance has been received from many valued correspondents whose names appear in the work. With some slight alterations the nomenclature, as in the first Volume, is similar to that of the authors of the "Catalogue of Birds in the British Museum," and to whom I here acknowledge my indebtedness.

One hundred and seventy-five species of Australian and Tasmanian birds are described in this Volume, of which the types of the following four species are in the Australian Museum Collection:—*Climacteris superciliosa*, *Ptilotis heartlandi*, *P. leilavalensis*, and *Pardalotus assimilis*.

The figures of eggs, which are of the natural size, have been reproduced by the heliotype process at the Government Printing Office, from photographs of the originals taken under the direction of the Government Printer, Mr. W. A. Gullick, and the personal supervision of Mr. A. E. Dyer.

The original drawings of birds, from which the figures have been reproduced, were made by the late Mr. Neville Cayley, who also coloured the plates of eggs in the coloured copies. The photographs of nests are the work of the Museum Photographer (Mr. H. Barnes, Junr.), Mr. George Savidge of Copmanhurst, and myself.

A.J.N.

SYDNEY, *September, 1900.*

THE dates of publication of the parts comprising the Volume are as under :—

- PART I., pages 1–105, plates A. 9, A. 10, A. 11, B. VIII, B. IX. 1st November, 1906.
„ II., pages 106–234, plates A. 12, B. X., B. XI. 22nd July, 1907.
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Part II. is in the press.

R. ETHERIDGE,
CURATOR.

AUSTRALIAN MUSEUM, SYDNEY,
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HEREWITH is issued Part III., the concluding part of Volume II. It is a continuation of the Order Passeres, and contains the Families Hirundinidæ, Artamidæ, Sturnidæ, Motacillidæ, Alaudidæ, Pittidæ and Menuridæ, and a portion of the Order Picariæ, comprising the Families Caprimulgidæ, Podargidæ, Coraciidæ, Meropidæ and Alcedinidæ. The figures of eggs, which are of the natural size, were reproduced by the heliotype process at the Government Printing Office, from photographs of the specimens, taken under the direction of the Government Printer, Mr. W. A. Gullick, and the supervision of Mr. A. E. Dyer. As in the previous Parts, the illustrations of birds are reproduced from drawings made by the late Mr. Neville Cayley, who was also responsible for hand-colouring the plates of eggs in the coloured copies.

R. ETHERIDGE,

AUSTRALIAN MUSEUM, SYDNEY,

CURATOR.

September, 1909.

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Genus GYMNORHINA, Gray.

Gymnorhina tibicen.

BLACK-BACKED MAGPIE.

Coracias tibicen, Lath., Ind. Orn., Suppl., p. xxvii., (1801).

Gymnorhina tibicen, Gould, Bds. Austr., fol., Vol. II., pl. 46 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 175 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 91, (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 276 (1903).

ADULT MALE—*Head, sides of the neck, scapulars and upper portion of the back glossy blue-black; hind-neck and lower portion of the rump and the upper tail-coverts white; upper wing-coverts white; primary coverts black, the outer webs of the innermost feathers white for about three-fourths of their length; quills black; tail white with a broad terminal band of black, increasing in width towards the outermost feather, which has the outer web entirely black for the greater portion of its length; cheeks, throat, and all the under surface glossy blue-black, the feathers on the lower portion of the body devoid of lustre; bill bluish-horn colour blackish at tip; legs and feet black; iris reddish-brown. Total length in the flesh 17 inches, wing 10.6, tail 6.25, bill 2, tarsus 2.3.*

ADULT FEMALE—*Differs from the male in being slightly smaller, and in having the hind-neck, lower portion of the back and the rump grey instead of white.*

Distribution.—Queensland, New South Wales, Victoria, South Australia, Western Australia?



BLACK-BACKED MAGPIE.

FEW birds, if any, are better known to the inhabitants of Australia than the Black and the White-backed Crow-Shrikes, or Magpies, as they are more frequently called; either in a wild state or in captivity.

The present species is widely distributed over nearly the whole of the eastern and southern portions of the continent. In the Catalogue of Birds in the British Museum, Dr. H. Gadow also records an adult male from North-western Australia,

obtained on the Sutton River, by Mr. M. Elsey on the 2nd November, 1856.

It is resident throughout the year in New South Wales, and evinces a decided preference for open forest country, partially cleared lands and cultivation paddocks. Although never found in heavy timber-clad ranges, no sooner is a clearing made to any extent in one of these virgin forests and cultivated, than it is usually tenanted by a pair or more of these birds. It is also frequently met with in large flocks on the open plains, more especially during the summer and autumn months.

Insects and their larvæ form the chief portion of its food, varied with worms and occasionally small reptiles, birds and field mice. As it will also eat raw meat, either in a wild state or in captivity many of the present and following species are victims of the poisoned baits laid for Crows, and Ravens. To the pastoralist this bird is of inestimable value in ridding the plains of countless myriads of locusts, grasshoppers, and other insect scourges and their larvæ. To the agriculturist and orchardist also it renders great service in clearing the ground of many insect pests while ploughing is in progress, or the soil is being turned up around or between the rows of fruit trees. While much may be said in favour of the Magpie, there are not a few who complain of its depredations. In many districts it has been proved to have done serious damage where wheat or oats have been sown, eating all the seed not covered with the harrow, and latter on pulling up the seed when it is germinating. Frequently in the latter case it is to obtain the grub attacking the seed at its base. No one can be blamed for protecting their crops either by frightening and driving the birds away, or by more stringent means. It will be found, however, that the harm done, is greatly outweighed by the general beneficial results of these birds provided by Nature to help keep destructive insects and their larvæ in check. Although the Black-backed Magpie frequently preys upon small birds, it is remarkable that some of the smaller insectivorous species, and particularly *Geobasiliscus chrysorrhous*, often construct their nests under its domicile.

The notes of the Black-backed Crow Shrike or Magpie are very melodious, and it is pleasant to hear in the early morning the flute-like strains poured forth by a number of birds from the topmost branches of some neighbouring tree. Its warning notes on the approach of an intruder however, which resemble a short high sounding "quark, quark" are somewhat harsh and discordant.

Variation exists in the size and plumage of this species. Generally it is in the extent of white on the bastard wing and on the basal portion of the outer web of the outermost tail feather. The latter in some adult specimens is entirely absent, in others it is a short narrow edging on the base of the feather only, while in very old males it may be found to extend obliquely from the shaft right across the basal half of the outer web. The width of the black band too on the back varies considerably in some specimens, which points to their being hybrids between the present and the following species. Of such examples in the collection is a fine old adult male procured on the Blue Mountains, which has the black dorsal band little more than half the usual width. In very old males the basal portion of the bill is whitish-horn colour, pale bluish-horn colour on the centre and blackish at the tips; the iris too is a bright fiery-red. Three adult specimens received from the Western Australian Museum, Perth, are respectively labelled "*G. leuconota*, Cranbrook, sex ?" "*G. leuconota*, male, Busselton," and "*G. dorsalis*, female, S. W. Australia." They may all be distinguished by the larger amount of black on the upper parts extending from the back upwards on to the hind neck, and down as low as the rump; two of them have the feathers on the lower hind-neck, and the rump margined with white, and small white spots at the tip of the remainder of the feathers on the back; in the other these white markings on the upper parts are almost entirely absent. Two have the bill longer than in typical eastern examples; in the other it is of the ordinary length. The wing measurement varies from 9.3 to 10.1 inches. All belong to a black-backed form of *G. tibicen*, not *G. leuconota*. It is somewhat remarkable that an adult male and female of *G. tibicen* obtained by Mr. H. G. Barnard at Bimbi, on the Dawson River, Queensland, in 1905, should have similar long and narrow bills like the western birds, but the extent of black is much narrower than typical examples from even New South Wales and greatly more so of course than in specimens from Western Australia. Wing measurement of the adult male 10.1 inches; of the adult female 9.3 inches. Dr. E. Hartert subspecifically distinguishes specimens from Nullagine, North-western Australia on account of their larger size and especially their longer bill under the name of *Gymnorhina tibicen longirostris*.²

Dr. W. MacGillivray writes me "*Gymnorhina tibicen* is very common in the Cloncurry District, Northern Queensland, especially along the creeks which intersect the open downs country. They nest mostly during the winter, and occasionally also during the wet season in the early part of the year. The eggs are very much smaller than those of Victorian birds." Later on he writes from Broken Hill, Western New South Wales:—"Gymnorhina tibicen is the only species up here of this genus, and is numerous. They nest later than *G. leuconota* does in the Western District of Victoria, commencing late in August, whereas in Victoria it commences early in July. On a day's outing, 23rd September, 1901, I examined many Magpie's nests and found in most of them eggs at an advanced stage of incubation—on the point of hatching—or newly hatched young; many contained fresh eggs and some were only building; the season was a good one and food abundant. They nest usually out along the smaller creeks and gullies in the low ranges about here."

Relative to a trip made in August 1900, to Mount Gunson, about one hundred miles to the north-west of Port Augusta, South Australia, Dr. A. M. Morgan writes me:—"Gymnorhina tibicen is the rarer of the two species about Port Augusta, but at Mount Gunson it is much the commoner, *G. leuconota* being very seldom seen, but neither species is common. Three nests were taken, one at Elizabeth Creek with two young birds and an addled egg; another in the same locality, with two eggs; and the third at Yultacowie Creek, with two fresh eggs of a very elongate form. One pair of birds at Elizabeth Creek were very pugnacious and attacked fiercely and repeatedly a Whistling Eagle which had its nest in a neighbouring tree."

The nest is a deep bowl-shaped structure, irregularly formed externally, of thin sticks and twigs, the inside being rounded and neatly lined with fibrous roots, coarse grasses, bark fibre, cowhair, wool, or any soft and warm material. An average one measures externally fourteen inches in diameter by six inches and a half in depth, and internally seven inches in diameter by three inches and a half in depth. Not infrequently curved or bent pieces of telegraph or fencing wire enter largely into the construction of their nests; there is one in the Australian Museum collection, taken by Mr. W. H. Loder, at Hermitage Plains, Cobarr District, New South Wales, in July 1900. It was built in a White Box tree about thirty feet from the ground, and externally consists chiefly of lacing wire, used in wire-netting fencing, the cup-like cavity which is small, being lined with bark fibre, horse and cow-hair. The nest is usually built in the upright forked branches of a Eucalyptus, at a height varying from twenty to sixty feet from the ground, at other times, in country districts where the birds are unmolested, in the top of a sapling or bushy crown of a pine or tea-tree at an altitude of about ten to twenty feet, and occasionally it is placed low down among the rigid branches of some bush out on a plain.

The situation of the nest is frequently betrayed by the aggressive manner of the male on one approaching near the tree in which it is placed, and the persistency with which it will swoop down and viciously snap at the intruders head. Not only does it exhibit its savageness to mankind, but to any bird or animal venturing on its domain. On more than one occasion I have observed a dog beat a hasty and ignominious retreat from the fierce attacks of these birds. Instances are many of birds in a state of semi-domestication pairing with wild birds and returning again to their owners after rearing a brood. Isolated pairs, too, remain to breed in the same place year after year. In a small paddock fronting one of the outlying streets of Chatswood, and another of a few acres in extent at Roseville a pair of these birds have reared a brood every season for the past seven years, but have never ventured to build in similar trees surrounding their domains. The nests have always been placed well out of the way of bird-nesting boys, the last nest built by the pair of birds at Chatswood, being in a thick bare dead fork of a *Eucalyptus* close to the street, but fully seventy feet from the ground. Travel by rail anywhere in open forest lands in New South Wales, the stick-formed nest, either new or in various stages of dilapidation, of the Black or the White-backed Magpie is usually a prominent feature in the landscape.

The eggs are usually four, frequently three, and occasionally as many as five in number for a sitting, and with the exception of those of *Gymnorhina leucocota* which are indistinguishable from them, are probably more variable in colour than those of any other species of Australian bird. They are oval or elongate oval in form, the shell being close-grained, smooth and lustrous. The ground colour varies from greenish-blue to a dull bluish-white, and from a reddish-grey to a dull brown. One of the most common varieties found is of a pale bluish-white ground colour, which is almost obscured with short streaks, scratches and smears of reddish or chestnut-brown, uniformly distributed over the shell, in others the markings are confluent, forming dull indistinct clouded patches. Some are of a faint-bluish grey ground colour, over which is sparingly distributed rounded or slightly smeared penumbral spots of different shades of inky-black and burnt umber. Another type is of a similar ground colour, but has faint irregular shaped markings of wood-brown intermingled with underlying smears of faint violet-grey. A not uncommon variety is of a dingy ashy-brown ground colour with a few smears, short streaks or nearly obsolete spots of a deeper hue sparingly distributed over the shell. A set of four taken by Mr. James Ramsay at Tyndarie, New South Wales, on the 7th October, 1879, measure:—Length (A) 1.35 × 1.08 inches; (B) 1.5 × .08 inches; (C) 1.32 × .05 inches; (D) 1.48 × 1.07 inches. A set of four taken on the 10th October, 1896, measures:—Length (A) 1.63 × 1.13 inches; (B) 1.55 × 1.13 inches; (C) 1.65 × 1.12 inches; (D) 1.45 × 1.16 inches. A set of remarkably small eggs taken by Mr. Wilfred Bennett at Yandambah Station, New South Wales on the 3rd September, 1899, measures:—Length (A) 1.45 × 1.1 inches; (B) 1.3 × 1.07 inches; (C) 1.36 × 1 inch. Two more eggs taken by Mr. Bennett a week later from the same nest, measure:—Length (A) 1.38 × 1.02 inches; (B) 1.27 × 1.01 inches. Two eggs taken by Mr. A. S. Boyd, on the 13th September, 1899, near Townsville, Queensland, measure:—Length (A) 1.51 × 1.05 inches; (B) 1.53 × 1.07 inches. On Yandambah Station the late Mr. Kenric Harold Bennett on one occasion found the eggs in a nest of this species that he had examined the week before, completely covered with a thick layer of rabbit fur, evidently, he believed as a safeguard against the marauding propensities of the Raven and Crow, which are notorious robbers of the eggs of other birds, especially when the owners are absent from them.

Young birds resemble the female, but are much duller in colour, the feathers of the hind-neck are more or less spotted with black near the tip, and those of the back are narrowly edged with grey; throat and remainder of the under surface brownish-black, the former being strongly washed with ashy and the feathers of the latter margined with ashy-white at the tips. The last trace of immaturity is usually exhibited in the lesser extent of white on the outer webs of some of the primary coverts.

Young birds reared from the nest are in great request as pets, for they soon learn to speak and in time acquire an extensive vocabulary, besides imitating any familiar sounds such as the barking of a dog or crowing of fowls. If allowed their freedom and the run of a garden an old male is often as good as a watch dog in the day time, for it will immediately give warning of one approaching the place by its loud notes of displeasure, if it does not also savagely attack the intruder. There is a drawback, however, in allowing these birds their liberty, they are fearfully mischievous, and have a *penchant*, when unobserved of stealthily appropriating small articles that can be easily carried off, more especially anything formed of metal, and secreting it in a hoard like the true Magpie (*Pica caudata*) of Europe. One of these *caches*, formed by a bird in my possession, I discovered in a shallow hole underneath a thick low spreading shrub in my garden, that revealed a miscellaneous collection of articles, consisting of thimbles, small spoons, needles, lead-pencils, and a quantity of nails. When reared from the nest these birds are very affectionate and become much attached to their owners; many, however, are sold that have been trapped after they have left the nest for several weeks, these birds although young, generally

remain wild and frightened and rarely emit a sound, except a disconsolate "squark," and it is a kindness to restore these unfortunates to freedom again in the bush.

In South-eastern Australia the normal breeding season commences in July or early in August, and continues until the end of November, but a second brood is sometimes reared during the mid-summer months. At the Redfern Railway Station, Sydney, on the 20th February, 1897, I saw young birds exposed for sale that had only recently been taken from the nest.

Gymnorhina leuconota.

WHITE-BACKED MAGPIE.

Gymnorhina leuconota, (Gould) Gray, Gen. Bds., Vol. II., pl. 73 (1844); Gould, Bds. Austr., fol., Vol. II., pl. 47 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 176 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 92 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 276 (1903).

ADULT MALE—*General colour above white; upper wing-coverts and edge of wing white; bastard wing and primary coverts black, the basal half of the outer webs of the latter white; quills black, slightly glossed with blue-black on their outer webs; tail white with a broad terminal band of black, increasing in width towards the outermost feather on either side, which has also the outer web black; head and nape glossy blue-black; under surface glossy blue-black, the centre of the feathers on the breast black and devoid of lustre; thighs blackish; vent and under tail-coverts white; bill bluish-grey, paler at the base, black at the tip; legs and feet black; iris reddish-brown. Total length in the flesh 18 inches, wing 11.8, tail 6.5, bill 2.1, tarsus 2.4.*

ADULT FEMALE—*Differs from the male in being slightly smaller, in having the feathers on the hind-neck washed with grey, and those of the back grey tipped with white and having a distinct black shaft streak; rump and upper tail-coverts grey broadly margined with white, some of the feathers showing a more or less well defined black shaft-streak.*

Distribution—New South Wales, Victoria, South Australia, Central Australia, Western Australia ?

THE White-backed Crow-Shrike, or Magpie as it is generally called, is freely distributed throughout southern New South Wales, the greater portion of Victoria, South and Central Australia. In New South Wales, Mr. R. Grant has obtained it as far north as Lithgow on the Blue Mountains, but it is more abundant in the south-eastern portion of the State occurring in considerable numbers at Tumut, Kiandra, Yarrangobilly, Cooma, and Bombala, and decreasing as the coast is approached at Twofold Bay. Relative to its habits, food, nidification, and the variation in colour of its eggs, the remarks made on *Gymnorhina tibicen*, equally applies to the present species.

There is a great variation in the size of specimens obtained even in the same locality. As a rule adult males procured in the cold mountainous districts in the neighbourhood of Cooma and Mount Kosciusko, New South Wales, are larger than others from the hot plains of South and Central Australia, the latter approaching in size the smaller billed form *Gymnorhina hyperleuca* inhabiting Tasmania. Adult males received from the Western Australian Museum, Perth, and obtained at Blackwood in April 1897, may be principally distinguished by the narrower terminal black band on the tail and the less extent of black on the outermost feather, the bill is of the average length of extreme eastern examples, but is slightly more arched. The colour of the shafts of the tail-feathers of birds from all the southern parts of the continent varies, apparently with age, in some they are black, in very old birds they are white, while examples may also be obtained with some of the shafts white and the remainder black. Hybrids

between *G. tibicen* and the present species are not uncommon: adult birds of both sexes being sometimes found with a narrower but well defined black band across the back, in others they assume the form of a line of more or less scattered black feathers. There are also specimens in the Australian Museum collection with black feathers on the back each having a more or less sharply defined white margin on the apical portion. Several albinos and semi-albinos are in the mounted collection.

Open forest lands, clearings on mountain ranges, and plains are alike resorted to by this species, and like *G. tibicen* it follows in the tracks of settlement. Cultivation paddocks during ploughing time are favourite localities for these birds to congregate in, and at the same time do a vast amount of good in ridding the soil of grubs and insects. To this diet is added worms, small birds and field mice. On the same scale, this species has when hard pressed with hunger, showed the grain eating proclivities of its compeer *G. tibicen*.

Dr. W. Macgillivray writes me as follows:—" *Gymnorhina leuconota* is universally distributed in Western Victoria, and several nests are to be seen annually in the Blue Gums which grace the streets of Coleraine. Nesting usually starts early in July and nests may be found with fresh eggs until the end of October. One nest which I came across on a dead tree was rather a formidable affair, being composed of boxthorn twigs and fencing wire, this was evidently a matter of choice as there was no scarcity of other material in the vicinity. A Magpie in the possession of Mrs. W. Steel, who lives in Hamilton, has for eight successive seasons built a nest and reared a brood of young ones in a Blue Gum tree near the house, mating each time with a wild bird. All food for the young ones is obtained at the house till they leave the nest when they all go with the wild parent, and "Maggie," though quite able to fly, never accompanies them, but resumes her old life about the house. Two Magpies in the possession of Mr. Abraham Greed, in Hamilton, also nest in captivity, and I had the pleasure of seeing them sitting side by side on separate nests built in a tool box in an outhouse, one on eggs and the other on three young birds. These birds were male and female; one nest was first built by both birds, eggs were laid, the hen bird sitting on them until hatched, when they were handed over to the male bird, who fed and sat upon them, the female straight away started another nest and laid three more eggs on which she sat, only occasionally helping to feed the first brood when she came off the nest. Magpies are rather partial to wheat, an unfortunate taste, as great numbers die every summer from eating the poisoned wheat laid for rabbits; they have also been caught killing and eating young chickens to my certain knowledge."

The nest is an open bowl-shaped structure externally formed of thin sticks and twigs, the inside being neatly rounded and lined with shreds of bark, rootlets, cow or horse hair and rabbit fur. An average one measures externally fifteen and a half inches in diameter by seven inches in depth, and internally seven inches and a half in diameter by four inches in depth. The upright forks of a *Eucalyptus* or *Casuarina* from twenty to sixty feet from the ground is a favourite nesting site, but often it is built at a low altitude in the bushy top of a green sapling or a tea tree, and sometimes in the tops of low bushes, within a few feet of the ground. Mr. A. M. N. Rose forwarded a nest to the Trustees of the Australian Museum, which was built in a low shrub close to the ground at Boloco, Snowy River. The birds had reared a brood in the same structure for several years, and during one season two broods. Mr. G. A. Keartland informs me that in company with Mr. Joseph Gabriel, a nest was found in August 1895 at Werribee, Victoria, in the top of a hedge about four feet in height. Nests largely composed of fencing or telegraph wire are not uncommon. There are two of these structures in the South Australian Museum, Adelaide, one forwarded by Messrs. H. and F. Rymill at Canowie in 1887, the other by the Hon. J. L. Stirling at Strathalbyn, in 1890.

Eggs usually four, sometimes three, and occasionally five in number for a sitting, extremely variable in colour and indistinguishable from those of *G. tibicen*. To the different types there described may be added some less frequently found of the present species. A very pale olive-brown ground colour with light umber clouded spots and blotches and underlying markings of dull ashy-grey. Ground colour reddish-buff, boldly spotted and blotched with rich reddish-brown and purplish-red, the latter appearing as if beneath the surface of the shell. Ground colour dull greenish-grey, with spots, streaks, and scratches of umber-brown intermingled with similar underlying markings of dark brown and ashy-grey. A very pale stone-grey ground colour, spotted and blotched with umber and sepia-brown. Eggs are also found of a uniform ground colour, with little or no indication of surface spots or other markings. A set of three taken by Mr. Joseph Gabriel, at Werribee, Victoria, on the 12th August, 1895, measures:—Length (A) 1.57 × 1.08 inches; (B) 1.54 × 1.11 inches; (C) 1.58 × 1.09 inches. Another set taken by Mr. Gabriel in the same locality, measures:—Length (A) 1.7 × 1.03 inches; (B) 1.65 × 1.08 inches; (C) 1.63 × 1.12 inches.

Although both *Gymnorhina tibicen* and *G. leuconota* are included in the Bird Protection Acts of the Southern Australian States, the eggs of these species are usually more frequently found in the indiscriminate and useless collections formed by bird-nesting boys in country districts, than those of any other Australian birds.

On the 18th December, 1896, I received two young birds, a male and a female from Mr. A. M. N. Rose, taken on Boloco Station, Snowy River, New South Wales. They were seven weeks old, the male having the back slaty-grey, the apical portions of the feathers shaded with black and their tips pale brownish-white, the white upper wing-coverts having a subterminal black bar and tipped with white. The female was similar, but had the feathers on the back more strongly washed with black. On the 1st February, 1897 the male died, its plumage had not altered much, but the back of its head and neck was a pure white. On the 21st February, the female was undergoing the first moult and acquiring the full adult plumage, moulting some of the feathers on her back which were replaced with others of a clear french-grey with a narrow black shaft line, which were very conspicuous among her old feathers. Further observations were prevented by the loss of the bird shortly after completing the first moult.

Many pages might be written without exhausting the amount of damage or mischievous pranks, one of these birds in a state of semi-domestication could perform. An old adult male I had that was occasionally allowed the run of the garden, used to delight in pulling up everything it saw me plant. Another favourite pastime, was to stealthily creep up behind a bull-dog and suddenly tweak his tail, and with an exultant note, beat a hasty and safe retreat. This bird, the terror of the place, at last met his match. Fowls it would attack with its powerful mandibles and easily drive away, but a newcomer, got into the garden one day, which the bird attempted to eject. The young game-hen, for such it was, with lowered head quietly stood her ground, and waited for the Magpie, and before the latter was aware of it, was suddenly turned over on his back by the hen using her legs, the operation being repeated immediately it got on its feet again.

The normal breeding season commences in July and continues until the end of December. This species usually defends its nest with great energy, but on several occasions I have seen the male quietly feeding out on the plains and apparently unconcerned at the loud cries of distress of the female, who was being robbed of her eggs a short distance away. It used to breed in Albert Park, and in the tea-tree scrub at the mouth of the Yarra River near Melbourne, during my early collecting days, and more freely, recently at Essendon, Keilor, Werribee, and Laverton. On the level, stone walled plains of Keilor and Deer Park, small flocks of these birds disturbed by a passing vehicle or train, form a conspicuous and pleasing feature in an

otherwise somewhat monotonous landscape. Frequently the nests of the Yellow-rumped Thornbill (*Geobasiliscus chrysorrhous*) and the Squeaker (*Aphelocephala leucopsis*) are constructed beneath the nests of this species.

Gymnorhina hyperleuca.

TASMANIAN MAGPIE.

Gymnorhina hypoleucus, Gould, Proc. Zool. Soc., 1836, p. 106.

Gymnorhina organicum, Gould, Bds. Austr., fol., Vol. II., pl. 48 (1848); *id.* Hand-bk. Bds. Austr., Vol. I., p. 178 (1865).

Gymnorhina hyperleuca, Gadow, Cat. Bds. Brit. Mus., p. 93 (1883); Sharpe, Hand-J. Bds., Vol. IV., p. 276 (1903).

ADULT MALE—*Like the adult male of GYMNORHINA LEUCONOTA*, Gould, but not so large and having a comparatively smaller bill. Total length 14 inches, wing 9.5, tail 5.6, bill 1.6, tarsus 2.

ADULT FEMALE—*Differs from the adult female of G. LEUCONOTA in a similar manner as does the adult male.*

Distribution—Tasmania.

THIS is a small form of *Gymnorhina leuconota* of the Australian continent, and from which it is otherwise indistinguishable, except for a comparatively smaller and less robust bill. The above measurements are taken from a fine old adult male obtained by Mr. George Masters, in April 1867, at the Ouse River, Tasmania. Three young birds were received in the flesh from Dr. L. Holden, Bellerive, near Hobart, together with the following note, under date 7th October, 1904. "I picked up the dead Magpies here to day I am forwarding you, they were poisoned I fancy, as one is prohibited from shooting them. The natural habitat of *Gymnorhina organicum* is the open or lightly timbered districts in the eastern and drier side of Tasmania. I have known of attempts to introduce it into western and more humid localities, but I think, with small success. This species has been protected by law for many years, and is plentiful and familiar everywhere. It is very popular as a pet, and it has a capacity for whistling tunes, nor need space be wasted on its beautiful wild music. It breeds in low trees, often in the close neighbourhood of houses. I saw one of their nests in 1903 built in the same tree in which *Myzantha garula* was breeding. The basis of the nest is dried sticks. The nest is often placed among terminal branchlets where it can only be reached with difficulty."

Mr. E. D. Atkinson sends me a note from his brother the Rev. H. D. Atkinson of Evandale that this species constructs a bowl-shaped nest of sticks, lined inside with wool and hair, and placed in gums, *Banksias*, and scrub, four and sometimes five eggs being laid for a sitting, and that he has taken nests with eggs from 6th September to 6th October.

A set of three eggs taken by the Rev. H. D. Atkinson at Evandale, are oval in form and slightly pointed at the smaller end, the shell being close grained, smooth and slightly lustrous. They are of a rich greenish-grey ground colour, over which is distributed, but more abundantly on the thicker end, scratches, streaks and small blotches of light umber; almost obsolete markings of the same colour appearing as if beneath the surface of the shell; Length (A) 1.55 × 1.03 inches; (B) 1.52 × 1.05 inches; (C) 1.47 × 1.05 inches.

Genus **CRACTICUS**, Vieillot.**Cracticus destructor.**

BUTCHER-BIRD.

Vanga destructor, Temm., Man d' Orn., pt. i. p. lix.*Cracticus destructor*, Gould, Bds. Austr., fol., Vol. II., pl. 52 (1848); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 100 (1883); Sharpe, Hand-l Bds., Vol. IV., p. 277, (1903).*Cracticus torquatus*, Gould, Handbk., Bds. Austr., Vol. I., p. 184 (1865).

ADULT MALE—*Crown of the head, ear-coverts, sides of neck, nape, and centre of the hind-neck black; sides of hind-neck white; scapulars, back and rump grey: upper tail-coverts white; upper wing-coverts like the back, the greater coverts blackish on their inner webs, the central feathers white on their outer webs; quills dark brown, the inner three secondaries margined with pure white more broadly on their outer webs; tail feathers blackish-brown tipped with white, more largely on the inner web and on the lateral feathers: loral spot white; chin, cheeks, throat, and all the under surface greyish-white; under tail-coverts white; bill bluish horn colour, blackish towards the tips; legs and feet black, tinged with olive; iris reddish-brown. Total length in the flesh 11.25 inches, wing 6, tail 4.65, tarsus 1.2.*

ADULT FEMALE—*General colour above brown, slightly darker on the head, the rump and upper tail-coverts ash-olive, some of the longer feathers of the latter dull white irregularly margined with brown: sides of neck fulvous, mottled with brown, some of the feathers on the centre of the hind-neck centred with fulvous; wings and tail brown and with a less amount of white on them than in the male; a broad loral streak dull white; cheeks and ear-coverts dark brown, the latter streaked with fulvous; chin and throat dull white, remainder of the under surface and under tail-coverts greyish-white washed with fulvous, more distinctly on the sides of the chest.*

Distribution—Queensland, New South Wales, Victoria, South Australia.

THE Butcher-bird or "Whistling Jack," as it is sometimes called is freely distributed over the eastern and south-eastern portions of the Australian continent. Although inland it may be found in the clumps of timber dotted over the plains, it gives decided preference for open forest lands near the coast, and thickly timbered mountain ranges. In the neighbourhood of cities particularly, it is decidedly shy and wary and difficult to procure, except when breeding.

Among a number of specimens now before me there is but little variation in those of similar age procured in widely separated parts of the continent. An adult male procured by Mr. George Masters at Port Lincoln, South Australia, in October 1865, is indistinguishable from another obtained by him at Gaydah, Burnett River, Queensland, in August 1870, and so little does the western form vary from the eastern species that Mr. Masters has labelled young birds in the Australian Museum, collected by him at Mongup, Salt River, Western Australia, in February 1869, as *Cracticus destructor*. The wing-measurement of fully adult males varies from 5.6 to 6 inches. The above descriptions are taken from very old birds, for this species may be found breeding when the adult male has the upper parts brownish-grey, with a less amount of white on the wings and sides of the neck, the head dark brown, and the under surface mottled with brownish-white.

In the neighbourhood of Sydney these birds are resident throughout the year, and are fairly common, usually being met with in isolated pairs at Belmore, Canterbury, Newington, Roseville and the high portions of the Milson's Point Railway Line. The notes of the male are clear and melodious, those uttered in autumn, being less sustained and different from its spring song. It is an early riser and one of the first birds to call.

Its normal food consists of insects of various kinds, principally beetles, crickets and grasshoppers, also small reptiles, birds and field mice. It frequently too, abstracts canaries and other small birds kept in captivity, through the wires of their cages. Mr. A. M. N. Rose shot and sent two Butcher-birds to the Trustees of the Australian Museum, that had succeeded in killing a number of canaries in a cage hanging under the verandah of his house at Campbelltown. At Blacktown a fine old male was uttering wild cries and making repeated swoops at a large *Larus varius* in the grass, but whether the bird was only amusing itself or attempting to destroy the reptile, which eventually I despatched, and found it measured three feet six inches, I cannot tell. Magpies also utter loud cries of alarm and make desperate dashes when they discover a large snake, which would be impossible for them to kill.



NEST AND EGGS OF BUTCHER-BIRD

The nest is an open structure, irregularly formed externally of thin sticks and long twigs, with which are sometimes intermingled vine tendrils, the inside is shallow and cup shaped, and lined with thin fibrous rootlets; some nests have a thick foundation of sticks and twigs, others are so scantily built that when they contain eggs the latter are visible through the bottom of the structure. The nest figured, was taken at Belmore, on the 2nd August, 1898, and averages six inches and a half in diameter by three inches and a quarter in depth.

It was built in a sapling about twenty feet from the ground and contained four eggs. Little or no choice is shown in the selection of a nesting site; the upright forks near the top of a gum sapling, tea-tree, or turpentine-tree being more often resorted to in the neighbourhood of Sydney. Usually it is built at a height of twelve to twenty feet from the ground, but sometimes it is placed within hand's reach.

The eggs are usually four, frequently only three, and occasionally five in number for a sitting; they are oval in form, the shell being close-grained smooth and lustrous. In ground colour they vary from a dull asparagus-green to pale ashy-blue, and from a clear olive to a light brown, which is dotted, spotted, and blotched with dull reddish-brown, purplish-red or chestnut-brown, the markings being confined almost entirely to the larger end, where they form, in some instances, a well defined cap or zone; others have blotches of reddish-purple, or rich umber-brown, with which are intermingled underlying spots of purplish-grey; while some of a light

olive-brown ground colour are more evenly spotted over the shell with a slightly darker shade of the ground colour, while on the larger end are a few conspicuous spots of an ink-like hue. A remarkably handsome type is of a pale apple-green ground colour with a broad clouded band around the larger end formed of numerous penumbral markings of rich reddish-brown, the remainder of the shell, with the exception of a few small spots and dots being entirely devoid of markings. While at Copmanhurst, where this species is common, Mr. G. Savidge showed me an unusual variety of its eggs in his collection. It was a set of four taken by him on the 21st October, 1894. Three of them were of a pale dull bluish-white, the other a deep blue, the markings on all of them consisting of only a few faint dull purplish spots; they measure:—Length (A) 1.18 × 0.92 inches; (B) 1.23 × 0.92 inches; (C) 1.24 × 0.93 inches; (D) 1.3 × 0.92 inches. Some varieties of the eggs of *Cracticus destructor* resemble those of the Fig-bird, *Sphæcotheres maxillaris*. A set of three taken at Belmore, New South Wales, on the 30th August, 1898, measure:—Length (A) 1.18 × 0.92 inches; (B) 1.15 × 0.87 inches; (C) 1.16 × 0.87 inches.

Immature birds resemble the adult female but have most of the feathers on the head and upper parts centred with fulvous, as are also the tips of the inner tail-coverts, the upper wing-coverts also having fulvous margins, the innermost of the greater series also being centred with fulvous, the tail feathers having only small dull white tips on the inner webs, which is also shaded with fulvous on the basal portion; a distinct eyebrow and broad central streaks to the ear-coverts fulvous. Throat dull white, remainder of the under surface greyish-white washed with fulvous, and having the remains of dull dark brown cross-bars on the feathers; under wing-coverts pale fulvous with indistinct streaks or barrings of dull brown. Wing 5.5 inches.

The fully adult plumage of the male is assumed by a moult. There is a specimen in the Australian Museum collection with a number of black feathers intermingled with the old brown ones on the crown of the head, and with most of the feathers on the back grey; the newer quills are entirely brownish-black, showing with marked contrast to the old worn pale-brown ones.

The late Mr. K. H. Bennett of Yandembah, wrote:—"On a station in Western New South Wales where I resided for some time, and where *Cracticus destructor* was numerous, I noticed a peculiar habit of these birds. They used to pull the wool off dead sheep and roll it up into pellets about the size of a large pea and almost as hard. In many instances the exposed portion of the dead sheep would be almost denuded of wool, whilst the ground alongside of the carcass would be covered with hundreds of these pellets. One day I discovered the cause, for I saw one of these birds alight on a dead sheep and pluck out a piece of wool and then throwing himself on his back on the ground and using bill and feet at the same time, soon had one made. Discarding it, he pulled out another piece of wool and resumed his pellet-making operations, continuing until he had made quite a number of them; subsequently I frequently saw them thus engaged. On many occasions I tried myself to make one, but they were always failures, I could not get the wool to remain in the round hard lump that the bird did."

Dr. A. M. Morgan sends me the following notes from South Australia:—"During a trip made in company with Dr. A. Chenery from Port Augusta to Mount Gunson, we found *Cracticus destructor* fairly common but very shy. Four nests were taken; one at Mount Gunson on the 31st July 1900, built in a mulga containing three fresh eggs, another in the same locality on the 12th August with two fresh eggs, and two at Arcoona on the 8th August; one nest in a pine tree contained three fresh eggs, the other built in a myall had one very large blood-stained egg. In the last three instances the female was sitting on the nest when it was discovered, who flew off as soon as the tree was touched, the male then made his appearance with a great clamour. When not nesting it was difficult to get a sight of the bird. Again, in company with Dr. Chenery in August 1902 we found it common throughout a trip made to the Gawler Ranges. One male bird had become so tame at Nonning homestead, that he came regularly to the house to be fed. While skinning birds there he came and picked up bits thrown to him. The body

of a Gilbert's Thickhead, which was thrown to him he picked up, and after taking two or three grips to get a good balance flew away with it to the scrub about half a mile distant."

Although the Butcher-bird is, as a rule, remarkably shy and wary in a wild state, when taken from the nest and domesticated it becomes remarkably fearless and trustful. Comparatively too, for its size, it is the most courageous of Australian birds. A fledgeling I caught in the bush and reared, used to pass the day among the shrubs in the garden and usually return to its cage at night. It used to fly on to my hand, perch on one of my fingers, whistle a few bars it had picked up, or preen its feathers. When I was seated at a table reading, it would lie down flat on its back and go to sleep in the palm of my hand. It was however, most jealous of other birds. A wounded *Trichoglossus concinnus*, it seized by the tail feathers and drew it backwards along the floor. A Skylark (*Alauda arvensis*) let out of its cage it seized by the neck, and which I had to quickly rescue. A stuffed specimen of *Strix delicatula* was then placed on the floor, which frightened it when it was first put down, but ultimately the Butcher-bird made terrific onslaughts on it, as it did afterwards on a stuffed male *Memura victoria*, a veritable living pigmy attacking a stuffed giant. Its chief delight was to capture a mouse, which would afford amusement to it for a quarter of an hour or more, before death freed it from its tormentor. On several occasions I attempted to take the mouse away, but the bird holding it in its bill and lowering its head with outspread wings would entirely hide it from me. On catching the mouse by the tail the bird would hold on to the body with its bill and allow itself to be lifted up in the air, but never once let go the firm grip in which it held its prey.

The normal breeding season of this species in Eastern Australia is August and the four following months, nests with fresh eggs, in the vicinity of Sydney, being more numerous in September, although a set of five heavily incubated eggs was taken at Belmore as early as the 31st August, 1893. At Roseville a pair have bred in the trees close to my house for several seasons, and in 1902 I observed them with fledgelings that had recently left the nest on the 26th December. At Enfield on the 27th May, 1894 I met a boy in the bush who had in his possession a nearly fledged young Butcher-bird which he informed me he had just taken from the nest. This was an unusual time for this species to breed, but was doubtless owing to the spring-like weather at that time and the two preceding months.

Cracticus leucopterus.

WHITE-WINGED BUTCHER-BIRD

Cracticus leucopterus, Gould, Bds. Austr. Introd., fol., Vol. I, p. xxxv. (1848); *id.*, Handbk. Bds. Austr., Vol. I, p. 187 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 98, (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 277 (1903).

IN his Introduction to the "Birds of Australia"^{*} Gould remarks: "*Cracticus leucopterus*, which inhabits Western Australia, is very closely allied to *C. torquatus* and *C. cinereus*, but differs from the former in the white mark on the wings being much more extensive, and from the latter in its smaller size." In the "Catalogue of Birds in the British Museum,"[†] Dr. H. Gadow in describing *C. leucopterus* gives the habitat as North-eastern and Western Australia, and writes: "In order to show that there is no difference in size between the specimens from Queensland and those from Perth, I give the measurements of a series of specimens." If the specimens referred to by Dr. Gadow are properly localized, it shows that the western does not differ from the eastern form *C. destructor*. The distinguishing characters given to the latter by Dr. Gadow in his key to the species of the genus *Cracticus*[‡] are those of an ordinary adult male, while those

^{*} Vol. I, Introd., p. xxxv (1848)

[†] Vol. VIII., p. 99 (1883).

[‡] *Loc. cit.*, p. 94, (1883).

given of *C. leucopterus* are equally applicable to a very old male of *C. destructor*, and agree with the specimens from which my descriptions of *C. destructor* are taken. Owing to the want of adult skins from Western Australia, I am unable to state whether the distinctions pointed out by Gould are of sufficient importance to warrant it being regarded as a distinct species.

Mr. C. G. Gibson informs me that in the Eriston District, Western Australia, he found a nest on the 12th September, 1905, built in a mistletoe growing on a big mulga. It was twenty feet from the ground and contained three eggs much incubated. On the 9th October following he found the nest of the same pair of birds also containing three incubated eggs.

A set of three eggs are oval in form, the shell being close-grained smooth and slightly lustrous. They are of a pale bluish-grey ground colour, dotted, spotted, and blotched around the thicker end with reddish and chestnut-brown, the markings being confluent in many places in two of the specimens; on the other they are more scattered and form an ill-defined zone. Length (A) 1.22 × 0.88 inches; (B) 1.18 × 0.9 inches; (C) 1.2 × 0.93 inches. The egg of *C. leucopterus* is figured on Plate B. VIII., fig. 16.

Cracticus cinereus.

TASMANIAN BUTCHER-BIRD.

Vanga cinerea, Gould, Proc. Zool. Soc., 1836, p. 143.

Cracticus cinereus, Gould., Bds. Austr., fol., Vol. I, Introd., p. xxxv. (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 186 (1865); Sharpe, Hand-l. Bds., Vol. IV., p. 277 (1903).

Cracticus cinereus (Subsp.), Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 101 (1883).

OF *Cracticus cinereus*, Gould writes in his "Handbook to the Birds of Australia": "By some ornithologists this bird may be considered only a local variety of *C. torquatus*, but I did not fail to notice that the birds appeared very different in their respective countries, and ornithologists will observe on examination that a marked difference occurs in individuals from Tasmania and New South Wales. I will not, however, affirm that this bird is confined to Tasmania, for I have lately received evidence of its also occurring on the shores of the opposite part of the continent. It may be distinguished from *C. torquatus* by its much longer bill, and when fully adult, by its grey back."

Gould's full description of the adult male of *Cracticus cinereus*, is equally applicable to the very old male of *C. destructor*.

In the "Catalogue of Birds in the British Museum,"† Dr. Gadow regards *C. cinereus* as only subspecifically distinct from *C. destructor*, but on different grounds from Gould. His remarks thereon are borne out by two males in the Australian Museum collection, one obtained at the Ouse River by Mr. George Masters, the other at Bellerive by Dr. L. Holden. As pointed out by Dr. Gadow, the Tasmanian birds are even more brownish-ashy on the back than the continental specimens, there is a less extent of white on the wings, and the basal half of the tail feathers are slightly washed with grey, and their outer webs have conspicuous white bases. I thought the latter character would enable one to distinguish the insular from the continental form, and although it is generally absent, or only slightly indicated in the Museum series of specimens, an adult male from Gayndah, Queensland, has the white bases to the outer webs of the tail feathers as large as in Tasmanian examples. The size of the white loreal patch is variable in both forms.

Mr. George Masters informs me that the note of *Cracticus cinereus* is quite different from that of the continental species *C. destructor*. Dr. L. Holden writes me *Cracticus cinereus* is not rare,

* Vol. I., p. 186 (1865).

† Vol. VIII., p. 101, (1883).

except in the wet districts, and when he is resident in a locality you cannot choose but hear him, as I do almost every day, with admiration, although he did tear my canary out of its cage. In confinement, which it bears well, this bird is apt to become savage."

Mr. E. D. Atkinson writes:—"Cracticus cinereus, known in Tasmania as the "Whistling-Dick," is found chiefly in the mid-lands country and where the land is lightly timbered. But I have met with odd pairs along the north-west coast, and south on the shores of D'Entrecasteaux Channel. My brother the Rev. H. D. Atkinson, of Evandale, informs me that he has found nests built in *Banksias* and *Eucalypti* in September and October, usually containing four, and sometimes five eggs in number for a sitting."

Through Dr. L. Holden, I have received the following note from Mr. Ernest Harrison:—"The nest of the Tasmanian Butcher-bird is built of thin dry twigs put together compactly but lightly. Considering the material it is very neatly made and is not thick or bulky; looked at from below the light can be seen all through it. The interior is a deep, very symmetrical saucer-shaped depression neatly lined with root fibre, etc. I have usually found the nest in rather stunted young gum trees, built in a clump of small branches on the side of the stem, and about fifteen or twenty feet from the ground. A small dry gully on a steep hillside is a favourite place."

The eggs are oval or elongated oval in form, the shell being close-grained, smooth, and slightly lustrous. They vary in ground colour from a dull asparagus-green to a light olive and pale reddish-brown, which is spotted and blotched with chestnut-red, particularly towards the larger end where on some specimens they form a cap or well defined zone. Some examples are indistinctly marked all over with a slightly darker shade of the ground colour. They cannot be distinguished from the eggs of *Cracticus destructor*. A set of three measure:—Length (A) 1·29 × 0·95 inches; (B) 1·26 × 0·93 inches; (C) 1·28 × 0·95 inches. An elongated specimen measures:—Length 1·36 × 0·96 inches.

Cracticus nigrigularis.

BLACK-THROATED BUTCHER-BIRD.

Vanga nigrogularis, Gould, Proc. Zool. Soc., 1836, p. 143.

Cracticus nigrogularis, Gould, Bds. Austr., fol., Vol. II., pl. 49 (1818); *id.*, Handbk. Bds. Austr. Vol. I., p. 180 (1865).

Cracticus nigrigularis, Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 95 (1883); Sharpe, Hand-l., Bds., Vol. IV., p. 277 (1903).

ADULT MALE—*Head and neck glossy black; a broad collar around the lower portion of the hind-neck white; scapulars and back black, some of the feathers on the lower back grey; rump and upper tail-coverts white; upper wing-coverts white, some having the inner web black; quills black, the basal portion of the outer webs of all but the two outermost primaries white, the outermost secondaries marginal with white on their inner webs which increases in extent and occupies both webs on the median series, the shafts alone being black; central pair of tail feathers black, the remainder black largely tipped with white, the black extending much nearer the tip on the outer web of the outermost feather, the base of the outer web of all but the central pair, and the outermost feather on either side, white; throat and chest glossy black; remainder of the under surface, the thighs and under tail-coverts white; bill bluish-horn colour, blackish on the apical portion; legs and feet dark grey; iris black. Total length in the flesh 15·75 inches, wing 7·2, tail 5·9, bill 1·7, tarsus 1·5.*

ADULT FEMALE—*Differs from the male in having those parts of the upper surface, wings and tail brown that are black in the male; crown of the head and nape a slightly darker brown, the collar on the lower hind-neck dull white, faintly mottled with brown, cheeks and ear-coverts dark brown*

minutely striated with pale brown; chin, throat and fore-neck pale creamy-brown; remainder of the under surface and under tail-coverts white. Total length in the flesh 13.5 inches, wing 7, tail 5.75, bill 1.7, tarsus 1.4.

Distribution—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, North-western Australia.



BLACK-THROATED BUTCHER-BIRD.

THE Black-throated Butcher-bird is widely distributed over the Australian continent, but does not appear anywhere to be a very common species. There are a number of specimens in the Australian Museum collection, obtained by Mr. George Masters at Gayndah on the Burnett River, Queensland, by the late Mr. J. MacGillivray on the Clarence River, New South Wales, by the late Mr. K. H. Bennett, procured in different parts of Western New South Wales, and others obtained by Mr. R. Grant on Buckingham Station. I have also examined specimens procured by Mr. G. A. Kearland in Central Australia, and others from the Trustees of the South Australian Museum, Adelaide, obtained in different parts of South Australia: from Mildura, Victoria, and from the Barrow Ranges and Coolgardie, Western Australia. Mr. Tom Carter informs me that he found it breeding inland from Point Cloates. Dr. E. P. Ramsay has also recorded it from the vicinity of Derby, North-western Australia,² and more recently Dr. E. Hartert³ enumerates specimens from Nullagine and the Coongan River.

The above figure represents an adult male.

The wing measurement of an adult male obtained by Mr. George Masters at Gayndah, Burnett River, Queensland in September 1870, is 6.85 inches; of an adult male procured by the late Mr. K. H. Bennett in the Lachlan District, New South Wales in June 1883, 7.15 inches; and of another adult male he obtained the following month at Moolah, 7.7 inches. The latter is the largest specimen I have seen. Immature males may be distinguished by the brownish shade towards the tips of the quills and by having the feathers of the head, throat and chest dull black instead of glossy black. Gould states that the sexes are precisely alike in colour and that they can be only distinguished with certainty by dissection. Mr. G. A. Kearland also states that the sexes are alike in plumage.⁴ This is contrary to my experience and observations, all the adult females I have seen differing in colour from the males as described above. This is supported too by the mass of material before me of which there is not a black and white female among them.

In New South Wales the present species is more freely distributed in the western and northern portions of the State. I met with it on the Clarence River, but have never observed it in the southern coastal districts, or in any part of south-eastern New South Wales. It is usually seen in pairs in open forest lands, pine scrub, and belts of timber on the plains. I found it breeding at Narrabri in November 1896, and again in the same month in the following year at Moree.

² Proc. Linn. Soc., 2nd Ser., Vol. I., p. 167 (1887).

³ Nov. Zool., Vol. XII., p. 229 (1905).

⁴ Rept. Horn. Exped. Central Austr. Zool., p. 71 (1896).

The clear and prolonged notes uttered by the male are among the most musical of those of any of our Australian birds, and can be heard a considerable distance away. If the bird were clad in sombre hue, instead of a conspicuous and strikingly contrasted plumage, its "native wood notes wild" alone would render it one, if not the most attractive of all our arboreal species. It is also one of the most wary birds I have stalked, generally flying one hundred yards or more when disturbed, and selecting a bare lateral branch of an isolated tree where it was almost impossible to approach within shooting range unobserved.

Its food consists of insects, principally beetles, crickets, also mice, reptiles, and small birds.

While resident at Point Cloates, North-western Australia, Mr. Tom Carter sent me the following notes:—" *Cracticus nigrigularis* occurs inland wherever patches of timber afford it shelter and food. It has a beautiful rich flute-like song, and when moonlight, I have heard it from two a.m. in the morning until sunrise. I took a nest with four eggs inland from here on the 20th July, 1900. It was a deep structure and built in a species of mallee. My attention was attracted to it by seeing the owners driving off some maurading Ravens. I shot both birds as I had not before come across them."

Mr. C. G. Gibson informs me that in the vicinity of the Mount Margaret Goldfield, in the Erliston District, Western Australia, he found a nest on the 13th August, 1905, built in a bull-oak twenty feet from the ground, containing three fresh eggs, and another on the 10th September following, also in a bull-oak, with three slightly incubated eggs.

The following notes have been extracted from information sent me at various times by the late Mr. K. H. Bennett while resident at Yandambah Station in the Lachlan District, New South Wales:—" *Cracticus nigrigularis* is found here alike in the bush covered sandhills on the plains, and in the densely timbered back country. Gould I observe makes no mention of the note of this bird, which in point of melody far surpasses that of *Gymnorhina tibicen*. Near the homestead is a detached building with thatched roof used as a dairy and meat-house, a space being left for ventilation of six inches between the top of the walls and the roof. At any hour of the day Black-throated Butcher-birds may be observed going in through the opening for the purpose of picking up the particles of meat left on the chopping bench. Indeed the carcass of each sheep hung up there, has to be enveloped in a bag to protect it from these birds. They are so tame that they will merely fly out on one entering the place and return again as soon as the person has quitted it. A pair have bred in one or other of the trees close to the house year after year. The young birds of each year remain with the parents for about fifteen months, after that only the original pair stay in the trees around the house. The pair of young ones of last year are still here now on the 18th October, 1890, and were constantly in the tree in which the parents had their nest until after the young ones are hatched. A fortnight ago, I took these young ones and placed them in a cage on the verandah. Ever since they have been in confinement they have been fed by the young birds of the previous year, whilst their parents, although always about the garden and saw them plainly, never came near them."

Later on I frequently saw the birds referred to above which Mr. Bennett had in captivity at Ashfield. Sparrows in search of food, who ventured in their spacious aviary fell an easy prey, so also did at various times the greater portion of a brood of chickens, who when unwittingly passing it, were bodily dragged in by the Butcher-birds through the loosely meshed wires, some of the victims being firmly wedged between upright acute angled forks of a tree placed in the aviary.

The nest is an open structure irregularly formed externally of thin sticks and twigs, and the inside, which is cup-shaped, is lined with fibrous rootlets and coarse grasses. An average nest measures externally nine inches in diameter by five inches in depth, the inner cup measuring

six inches in diameter by three in depth. It is usually placed in the upright forked branch of a *Callitris*, *Eucalyptus* or *Casuarina*, at a height varying from fifteen to forty feet from the ground.

The eggs are usually four, sometimes only three in number for a sitting, and vary from oval to rounded and elongated oval in form, the shell being close-grained, smooth and lustrous. Like the eggs of its compeer *C. destructor*, they differ considerably in colour and in the disposition of their markings. In ground colour they vary from a light asparagus green to a greenish or a uniform pale brown. A set of four of the latter type now before me, are thickly freckled and dotted all over with a slightly darker shade of the ground colour and are not unlike a variety of egg of the Little Water Crake: Length (A) 1.35 × 0.95 inches; (B) 1.36 × 0.93 inches; (C) 1.32 × 0.92 inches; (D) 1.33 × 0.92 inches. A set of three taken by Mr. G. Savidge at Copmanhurst, are of a yellowish-brown ground colour, spotted and blotched with different shades of umber, with which are intermingled conspicuous black ink-like spots, the markings predominating on the thicker end where they are confluent and form an irregular zone: Length (A) 1.43 × 0.95 inches; (B) 1.45 × 0.96 inches; (C) 1.42 × 0.95 inches. A set of four are somewhat similar, but are devoid of the ink-like spots, one specimen having the markings in the form of a zone around the smaller end, another with a distinct olive shade in the ground colour has a small cap formed of confluent dull blackish-brown on the thicker end: Length (A) 1.2 × 0.92 inches; (B) 1.18 × 0.98 inches; (C) 1.26 × 0.92 inches; (D) 1.2 × 0.95 inches. Of two more distinct types before me, one is of a dull asparagus green, freckled, spotted, and blotched with wood-brown, with a few underlying bluish-grey markings; the other is of a greenish-grey ground colour distinctly dotted and blotched with wood-brown and blackish-brown, the markings predominating on the thicker end, and resembling a variety of the egg of *Edolisoma tenuirostre*. Like *Cracticus destructor*, five eggs are sometimes laid for a sitting, and I received one of these unusual sets taken by Mr. H. G. Barnard, on the 14th September 1893, at Duinga in the Dawson River District, Queensland.

August and the four following months constitute the usual breeding season of the species in Eastern Australia, but nests with eggs are more often found in New South Wales during September and October. As will be seen by Mr. Carter's note, he took eggs of this species inland from Point Cloates, in the north-western portion of the continent in July.

Cracticus picatus.

PIED BUTCHER-BIRD.

Cracticus picatus, Gould, Proc. Zool. Soc., 1848, p. 40; *id.*, Bds. Austr., fol., Vol. II., pl. 50 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 181 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 96 (Subsp.); Sharpe, Handl. Bds., Vol. IV., p. 277 (1903).

ADULT MALE—Like the adult male of *CRACTICUS NIGRIGULARIS*, Gould, but smaller; bill (of skin) dark blue, lighter at the base of the upper mandible, blackish at the tip. Total length 11 inches, wing 6.1, tail 5, bill 1.4, tarsus 1.3.

Distribution—Northern Territory of South Australia.

THIS is a distinctly smaller form of *Cracticus nigrigularis*. The above description is taken from a specimen obtained at Port Darwin, and kindly lent by the Trustees of the South Australian Museum, Adelaide. In addition to its smaller size it may be furthermore distinguished by the black on the underparts not extending so low down on the chest. In this respect it is similar to an adult male in the Australian Museum, collected by Mr. E. J. Cairn, near Derby, North-western Australia in 1886, but the wing measurement is 6.8 inches. This specimen appears to be intermediate between *Cracticus nigrigularis* and *C. picatus*, closely approaching

in size the former, but with the less amount of black on the chest as in *C. ficatus*. The wing measurement of an adult male of *Cracticus nigrigularis*, obtained by Mr. George Masters, in September, 1870, at Gayndah, Burnett River, Queensland, is but slightly larger than the Derby example, measuring 6·9 inches, but the black feathers extend right on to the upper portion of the breast. The size of this species apparently agrees with the ordinary rule, that from the farther north they are found the smaller the birds.

An egg of *Cracticus picatus* taken on the 22nd October, 1898, by Mr. E. Olive, near the Katherine River, in the Northern Territory of South Australia, and kindly lent by Dr. Charles Ryan of Melbourne, is oval in form and tapering somewhat sharply towards the smaller end, the ground colour being a pale olive-brown, which is finely dotted, spotted, and boldly blotched on the larger end with different shades of olive, umber, and blackish-brown; over the remainder of the shell are uniformly distributed very fine dots and one or two blotches of umber brown. Length 1·27 × 0·92 inches. It is represented on Plate B VIII., fig. 10.

Cracticus rufescens.

RUFIOUS OR BLACK CROW SHRIKE.

Cracticus quoyi, (juv.)? Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 375 (1878).

Cracticus rufescens, De Vis, Proc. Linn. Soc., N.S.W., Vol. VII., p. 562 (1883); Sharpe, Bds. New Guin., Vol. III., pl. 16 (1888); North, Proc. Linn. Soc., 2nd Ser. Vol. XXII., p. 56 (1897); Rothsch., Ibis, 1900, p. 374; Robins. and Laver., Ibis, 1900, p. 632.

ADULT (DIMORPHIC)—*Forehead, crown of the head, nape, hind-neck and centre of the upper back black, each feather with a rufous shaft streak, which widens out considerably on the nape and hind-neck; lower back and rump dull brown with a narrow rufous shaft stripe and a broad indistinct tip of ochreous-brown; upper tail-coverts ochreous-rufous, with a well defined sub-marginal black bar; scapulars and lesser wing-coverts ochreous-brown, with broken blackish-brown crossbars; median and greater coverts blackish-brown, centered and broadly tipped with ochreous-rufous; quills brown, margined with light rufous; tail feathers light rufous, washed with dusky-brown on both webs of the central pair and on the outer webs of the remainder, becoming less pronounced towards the lateral feathers; lores, feathers below the eye and the ear-coverts dull rufous with an indistinct whitish shaft-streak; throat and all the under surface pale buffy-brown washed with rufous on the sides of the chest, where some of the feathers are submarginally edged with dark brown; under tail-coverts light rufous; bill bluish-horn colour, blackish at the tip; legs and feet dark lead colour; iris brown. Total length 13 inches, wing 6·7, tail 5·7, bill 2, tarsus 1·6.*

Others have the plumage entirely black, the feathers of the head and upper and under parts having glossy bluish-black margins, less distinct on the abdomen.

Distribution—North-eastern Queensland.

THE range of *Cracticus rufescens* extends throughout the coastal scrubs of North-eastern Queensland, from Cape York in the north to the Herbert River in the south. Dr. Ramsay first drew attention to this bird at a meeting of the Linnean Society of New South Wales, in November 1877, but stated that he believed it to be the young of *Cracticus quoyi*. After describing it, he added the following note:—"The only thing in favour of this bird being a distinct species is the fact that on six different occasions some of our best taxidermists have collected during the whole season in districts in which *C. quoyi* is plentiful, without once having met with any bird in a similar stage of plumage." Subsequently, Mr. C. W. De Vis, M.A., described it as a new species, under the name of *Cracticus rufescens*, from specimens also obtained by Mr. Broadbent

in the Tully and Murray River scrubs."* It is beautifully figured in the "Birds of New Guinea" from examples procured by the late Mr. T. H. Bowyer-Bower on the Mulgrave River. Specimens were also obtained by Messrs. E. J. Cairn and Robert Grant who were collecting in the same locality on behalf of the Trustees of the Australian Museum. Mr. Grant informed me that he usually met with this species on low lying lands, searching for insects among the fallen leaves in open parts of the scrub. During a period of eleven months collecting in that part of Queensland in 1888-9, he never saw two Rufous Crow-Shrikes in company, it was generally one rufous and one black bird, and there are two of these birds in the Australian Museum collection shot while feeding together in the scrub opposite Double Island.

It is somewhat remarkable that attempts were made to refute this statement, by quoting the experiences of other collectors in the same districts, who, it was stated, had never seen a rufous and black bird together, but always two rufous, or two black ones. Time, however, has proved that not only have they been seen in company, but young rufous and black birds have been found together in the same nest, while in other nests the young were all brown although the parents were black.

This difference in colour I drew attention to in 1897, when describing the eggs and fledgeling of *Cracticus rufescens*, in the Proceedings of the Linnean Society of New South Wales.† They were received from Mr. J. A. Boyd while resident on the Herbert River, Queensland, who sent me the following note:—"On the 26th October, 1896 a black gin brought me a pair of most peculiar eggs belonging to a species of *Cracticus*, which the natives call 'Kulgo' from its note. The male is a very noisy black bird, about the size of *Eudynamis*, the female brown. There is a great difference between the eggs, although in both the ground colour is very pale green. One is pyriform, with a lot of dark chocolate blotches on the larger end, and a band of green around the middle; the other is oval in form, a few ink-like markings taking the place of the blotches on the larger end, and the band around the middle is absent. Both eggs are heavily incubated, and one is broken in two places by the gin's teeth as she brought them down in her mouth. The nest, built between the trunk and a couple of branches of a small tree overhanging Ripple Creek, was a simple construction of twigs without lining, and showing daylight all through."

The eggs forwarded by Mr. Boyd are as described above. The narrow green band around the centre of one egg is purely an accidental marking, for similar bands sometimes occur in the eggs of other species. Length (A) 1.45 × 1.05 inches; (B) 1.43 × 1.03 inches. In a subsequent letter, Mr. Boyd wrote:—"Why this *Cracticus* is called *rufescens* I do not know, certainly the female is reddish-brown but the male is jet black," and again, under 12th May, 1898, "I have lost my pair of *Cracticus*, I saw both the black and the brown bird several times after my return home. They may have gone away to avoid the severe winter, but I do not remember them migrating before." The late Mr. W. S. Day, who resided for many years at Kuranda, near Cairns, also wrote me as follows:—"Cracticus rufescens is fairly common at Riverstone, sixteen miles from Cairns, I have shot a lot of them, but got very few on the top of the range. The female is always brown, so is the young male, but the old male is black." Upon the authority of Mr. K. Broadbent, and the late Mr. T. H. Bowyer-Bower, Mr. C. W. De Vis and Dr. R. B. Sharpe respectively agree in describing the sexes of *C. rufescens*, as being nearly alike in colour. Why a Rufous and a Black Crow-Shrike, should always be seen together, if not in sexual distinction of one species, was a mystery to me, and owing to the birds being by no means common on the Herbert River, Mr. Boyd was unable to grant my request for a pair shot at the nest. Of the adult rufous skins in the Australian Museum collection, one is much darker on the upper parts than the other, having the feathers on the crown of the head, nape, hind-neck, and centre of the upper back black with a narrow rufous shaft stripe, widening out on the crown and

* Proc. Linn. Soc. N.S.W., Vol. VII., p. 562 (1883).

† Proc. Linn. Soc. N.S.Wales, 2nd Series, Vol. XXII, p. 56 (1897).

nape into an acute angled patch on the apical portion of the feather; a broader submarginal black bar on the upper tail coverts and the median series of the upper wing-coverts brownish-black with a broad tip and narrower shaft streak of light ochreous rufous; on the foreneck is a dark brown submarginal line on some of the feathers. Judging by its wing-measurement 6.3 inches, I take it to be the younger of the specimens. The fledgling is almost similar in colour.

Writing from the Bloomfield River District, Mr. Frank Hislop remarks as follows:—"The Black and the Brown Butcher-birds are very common here. They are more numerous in the scrubs, mangrove flats, and swamps near the beach, but are often found in the open forest lands. Frequently a black and a brown bird are seen together, and my opinion is that they belong to one species, for their notes and habits are alike. Their food consists of lizards, frogs, insects, and small birds, they are also very destructive to the eggs of other birds. The nest is formed of sticks and lined with fibrous roots, and is generally built in the fork of a small tree at a height from twelve to twenty feet from the ground, and often in one growing near the water. They lay from two to four eggs for a sitting, and nests with eggs have been taken from September to December. The native name for these birds is 'Calboo'."

Absolute proof of a combined rufous and black, or intermediate stage of plumage, is given by Messrs. H. C. Robinson and W. S. Laverock who write as follows in "The Ibis":—"It is after very considerable hesitation, that we have come to the conclusion that all specimens of the black *Cracticus* from Eastern Australia must be referred to *C. rufescens*, De Vis. This name, however, is rather misleading, as it is only the young bird that is rufescent. In the course of the last three months some thirty specimens have passed through our hands. Of these, three have been in the plumage figured and described as *C. rufescens*. In one specimen, however, several of the primaries were black, and in another the under wing-coverts were partially black. We had called Mr. Olive's special attention to this point, and he assures us that the *C. rufescens* in brown plumage sent from Bellender Ker was found associating with the black-plumaged birds, and that he had no doubt whatever that they were one and the same species, as he has stated on the label. The larger series of birds in black plumage present certain difficulties among themselves, some being less lustrous than others, and having the basal portion of the flank-feathers greyer; but they cannot certainly be distinguished from the Port Essington and New Guinea bird, which is, however, black in every stage of plumage."

Messrs. Robinson and Laverock are undoubtedly correct in referring both the black as well as the rufous species of *Cracticus* inhabiting Eastern Queensland to *Cracticus rufescens*, De Vis. I have examined black examples from many intermediate localities between Cape York and the Herbert River, and rufous examples from the latter locality to the Endeavour River. Many writers have regarded this black form inhabiting North-eastern Queensland as *Cracticus quoyi*. Specimens of the latter now before me from the Laloki River, New Guinea may be distinguished by their duller plumage, the wings, tail and under surface being brownish-black, the brighter margins to the feathers on the upper parts are of a oil-green shade, and on the under surface, except on the sides of the breast they are almost obsolete. The wings and tail of the birds from North-eastern Queensland are darker than in *C. quoyi*, the margins of the feathers on the upper parts are glossy blue-black; and they are almost as pronounced on the under parts as they are above.

That this species is dimorphic in colour may be seen from the following information extracted from notes received by me almost simultaneously. Writing from Goondi Plantation on the Johnstone River, Queensland, Mr. E. H. Webb, remarks:—"I took several nests of *Cracticus quoyi* vel *rufescens* last season (1904), the nests each contained three eggs, and the birds I saw at them were all black. I noted a very few rufous birds about, they were always solitary, and I

* The Ibis, 1900, p. 632.

never saw two together. On the 3rd January, 1905, I was on one of the North Barnard Islands and found a nest containing three young ones, two black and one brown. The black birds were extremely numerous, their musical notes being heard in all directions, but I never saw a fully adult rufous one. During my search through the scrub on two of the largest islands, I must have seen quite fifty of them. They were eating the eggs of *Myristicivora spilorrhoea*, the broken shells of emptied Pigeons' eggs being visible almost everywhere."

Writing from Kuranda, near Cairns on the 21st February, 1905, Mr. H. Elgner sends me the following note:—"I took a nest of *Cracticus rufescens* this season, containing three brown ones; both parent birds were black. Another nest I found at Honey Creek, also contained three brown young ones, and in this instance also the parent birds were black." From these facts it is evident that the young may be either black or brown.

The eggs vary from oval to pyriform in shape, the shell being close-grained, smooth, and lustrous. In addition to the eggs previously described by Mr. Boyd, the ground colour varies from very pale olive-green to dull olive-grey, which is distinctly spotted and blotched with various shades of umber and blackish-brown, intermingled with a few ink-like spots and underlying spots of inky-grey, the markings as a rule being confined to the larger end of the shell. A set of two taken on the Mulgrave River, measure:—Length (A) 1.35 × 1.02 inches; (B) 1.35 × 1.1 inches.

A rufous fledgeling received from Mr. Boyd, captured by a kanaka girl on Ripple Creek Plantation, on the 26th November, 1895, is almost similar in the character of its markings to the adult, but the rufous centres to the feathers on the upper parts are broader and darker, the quills and tail are dark brown, and all the under surface fawn colour, the feathers on the lower neck being narrowly margined with rufous-brown. Wing 4.5 inches.

Gould was correct in stating that the northern coast is the only portion of Australia in which *Cracticus quoyi* has been observed. I have examined the type of *Cracticus spaldingi*, Masters* obtained near Port Darwin, and it is almost precisely similar to *C. quoyi* from the Laloki River, New Guinea. The bill of the former is longer and shallower, and the wing-measurement about half an inch longer. If not identical, *C. spaldingi* is very closely allied to *C. quoyi*. From the Alligator River a not far distant locality from where the type of *C. spaldingi* was procured, Dr. E. Hartert has subspecifically distinguished a Black Butcher-bird under the name of *Cracticus quoyi tunneyi*.† Judging from the description and the locality in which it was obtained, it appears to be the same as *C. spaldingi*, Masters, but to which Dr. Hartert makes no reference in enumerating the various forms of *Cracticus quoyi*.

In the "Catalogue of Birds in the British Museum,"‡ Dr. H. Gadow places *C. spaldingi*, Masters, as a synonym of *C. mentalis* of New Guinea, and the latter name actually appears in a List of Australian Birds, purported by its compilers to be an authoritative one on the Australian avifauna. After Dr. Gadow states in his description of *C. mentalis*, that it is "somewhat like *C. argenteus*," one would think even a tyro would hesitate to accept the name of *C. spaldingi*, (a bird having the head and upper parts dull black, and with dull rusty brown wings, tail, and under surface) as a synonym of that species. The two birds belong to entirely different sections of the genus. *C. argenteus* is a partially pied form with a silvery-grey back intermediate between *C. nigrigularis* and *C. destructor*, whereas *C. spaldingi* is not only a much larger species, but as stated by Mr. Masters in his original description "at first sight might be taken for *Cracticus quoyi*, Lesson."

* Proc. Linn. Soc. N.S.W., Vol. II., p. 271 (1877).

† Nov. Zool. Vol. XII., p. 228 (1905).

‡ Cat. Bds Bri Mus., Vol. VII., p. 102 (1883).

§ Austr. Assoc. Adv. Sci., Vol VII., p. 136 (1898)

Sub-Family PACHYCEPHALINÆ.

Genus PACHYCEPHALA, Vigors & Horsfield.

Pachycephala gutturalis.

WHITE-THROATED THICKHEAD.

Turdus gutturalis, Lath. Ind. Orn. Suppl. p. xli. (1801).*Pachycephala gutturalis*, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 239 (1826); Sharpe, Handl. Bds., Vol. IV., p. 306 (1903).

ADULT MALE—General colour above olive-green; band on the hind-neck rich yellow slightly washed in the centre with olive-green; lesser wing-coverts black broadly margined with olive-green; the median and greater series black externally margined with olive-yellow; quills black the secondaries broadly margined externally with olive-green, the primaries narrowly edged with ashy-olive; basal portion of tail feathers grey washed with olive-green, the apical portion blackish-brown tipped with grey; crown of the head, nape, a line of feathers below the eye and ear-coverts black; throat white, followed by a black crescentic band on the fore-neck which meets the black feathers on each side of the nape; remainder of under surface and the under tail-coverts rich gamboge-yellow, the sides of the breast slightly washed with olive-green; bill black; legs and feet dark slaty-grey; iris dark brown. Total length in the flesh 7 inches, wing 3 7/8, tail 3 3/8, bill 0 1/5, tarsus 0 9/16.

ADULT FEMALE—General colour above greyish-brown, slightly tinged with olive; upper wing-coverts and quills dark brown margined with dull olive; upper tail-coverts olive; tail feathers olive-brown; chin and throat dull greyish-white, indistinctly barred with pale brown; chest and breast pale brown, centre of the abdomen dull whitish; under tail-coverts pale yellow.

Distribution—Queensland, New South Wales, Eastern Victoria, (Western Victoria?).



WHITE-THROATED THICKHEAD.

ALTHOUGH I have kept *Pachycephala occidentalis* and *P. melanura*, distinct from the present species, after an examination of a large series of adult males of the yellow-breasted members of this genus, from different parts of the Australian continent, I find that they completely intergrade with *P. gutturalis*, and I look on both as races of this species. Taking extreme types from the western and northern portions of the continent, one would have no hesitation in pronouncing *P. occidentalis* and *P. melanura* to be good and distinct species but if specimens are examined from a number of intermediate localities, it will be found that both gradually merge into the original *P. gutturalis* of Latham, the type of the genus. The same intergradation is also apparent in the females of these races, except in that of *P. melanura*.

Probably the type of *P. gutturalis* was obtained near Sydney, for Dr. Latham in his original description of the Guttural Thrush, in the Supplement to his "General Synopsis of Birds," remarks, "Inhabits New Holland:

not unfrequently seen at Port Jackson in the winter months." The extent of olive-green on the basal portion of the tail feathers of the adult male varies from one half of their length to only a slight wash at their extreme base. In addition to their smaller size, typically the farther north the specimens are procured the richer they are in the gamboge-yellow colour of the under surface

and the smaller the olive-green bases to the tail feathers, until it is reduced to a slight wash at the base of the feathers only. These characters are not however, constant, for one of the most brilliantly plumaged adult males I have seen was obtained by Mr. R. Grant, on the Bellinger River, New South Wales, and fully equalled in depth of colour others procured by him over eleven hundred miles farther north at Cairns, North-eastern Queensland. Some specimens from the latter locality, except in the smaller size of the bill, are indistinguishable from examples of *P. melanura*; others have the characteristic olive-green wash to the basal portion of the tail-feathers. This variation in the extent of the olive-green wash on the tail-feathers is also found in specimens obtained in the same locality in the southern portions of the continent. The wing-measurement of adult males procured at Cairns varies from 3.35 to 3.45 inches. In a similar manner the band on the foreneck varies in width from a well defined zone of black feathers to a deep crescentic band. Of the latter type is an adult male in the Australian Museum collection, obtained at Port Mackay, Queensland, with a black band extending on to the upper portion of the breast and measuring nearly one inch in depth on the chest.

A specimen in Mr. Edwin Ashby's collection, obtained at the Black Spur, Victoria, has with the exception of the extreme tips, the tail feathers black for four-fifths of their length, and their bases dark grey with a faint wash of olive-green; the under surface is as rich in colour as a specimen of *P. melanura* in the South Australian Museum collection, obtained on one of the islands of Torres Strait.

Although *Pachycephalus gutturalis* is found in the coastal scrubs and brushes, humid mountain ranges are the favorite haunts of this species, its range extending inland in New South Wales to the western slopes of the Blue Mountains. Near Sydney it is more abundantly distributed on the highlands on the Milson's Point Railway Line, and is also common in the damp gullies about National Park and Waterfall.

It is possessed of cheerful notes, and from its habit of frequently uttering them immediately after a peal of thunder, the report of a gun, or any other loud and sudden noise, it is known to many residents of New South Wales as the "Thunder-bird." The brilliantly plumaged adult male is usually rather shy, except when engaged in the duties of incubation, which it shares with the female. When disturbed it resorts to some outspreading branch of a lofty tree, and generally keeps its duller coloured back to an intruder. Stomachs of these birds I have examined usually contained the remains of various kinds of insects, but principally beetles. In some, I also found a few small berries.

The nest is an open cup-shaped structure, rather roughly formed externally, but neat and rounded on the inside, the rim or one side of the same being usually broad and nearly flat. The materials of which they are formed vary according to their situation, some are built throughout of *Casuarina* leaves, others externally of plant stems and rootlets, intermingled with skeletons of leaves, and portion of dead fern fronds, lined with finer material. An average nest measures externally four inches and a quarter in diameter by three inches and a half in depth, the inner cup measuring two inches and a third in diameter by two inches in depth. The nesting site is extremely varied, generally it is in the upright forks of a bush or low tree at a height varying from five to twelve feet from the ground, but on the 18th October, 1902, I saw a nest at Ourimbah, being constructed by an adult male in the outer leafy branches of a Lillypilly at an altitude of fully thirty feet. In South Gippsland I have often found them artfully concealed in the dead drooping fronds of a tree fern, but usually they are fairly conspicuous objects and easily found. Low trees in or near the margins of mountain gullies are favorite situations. At Bundanoon, on the 9th November, 1894, I found a nest with the male sitting on two fresh eggs, and on the following day another nest with two incubated eggs, my attention being directed to the latter nest by the male bird whistling while sitting. At Eastwood, on the 24th October, 1896, I found a nest with the male sitting on three fresh eggs. At Chatswood in company with Mr. C. G. Johnston we found

a nest built in a Forest Oak, (*Casuarina suberosa*) overgrown with *Smilax australis*, on which the female was sitting on two slightly incubated eggs, and another nest built in a Needle Bush (*Hakea acicularis*), containing two fresh eggs. On the 3rd October, in the same gully I found a nest with the female sitting on a chipped egg and a newly hatched young one, another on the 9th October with two young, and one on the 26th October with two fresh eggs. On the 25th November following I found a nest built on the frond of a tree-fern growing on the bank of a creek at Ourimbah. This nest was largely composed of fine green grass stems, and was constructed so far as I observed, entirely by the female, who later on very reluctantly left it when I stood underneath the fern to take the eggs. In September and October 1904, this species bred freely in orange and lemon trees close to the Roseville Railway Station.

The nest and eggs figured on Plate A 9, were taken at Chatswood on the 25th September, 1898. The nest was built in a Lillypilly (*Eugenia smithii*) growing in the bed of a creek, and the male was sitting on two eggs, which were slightly incubated. Outwardly it is formed of long dried plant stems with a slight admixture of spider's webs, the inside being scantily lined with fine dried grasses and a few thread-like leaves of *Casuarina suberosa*.

The eggs are usually two, sometimes three in number for a sitting, oval or elongate oval in form, the shell being close-grained, smooth, and more or less lustrous. They differ considerably in the size, and distribution of their markings; the ground colour usually varying from a pale creamy white to creamy-buff. One of the most common types is of a creamy or faint buffy-white ground colour, which is freckled, dotted or blotched with umber brown, with which are intermingled a few underlying spots of faint inky-grey, the markings predominating and becoming confluent on the thicker end where a well defined zone is formed; in others the markings are distributed almost uniformly over the surface of the shell. A very unusual coloured set of three I took at Childers in South Gippsland, from a nest built among some dead fern fronds, are of a distinct reddish-buff ground colour with umber and blackish-brown markings. Another set of two from Hastings, Western Port Bay, Victoria, are almost pure white, one having a cap, the other a penumbral rich umber-brown band on the larger end, and entirely devoid of the usual freckles, spots, or blotches. A set of two taken at Chatswood in September 1898, have numerous small underlying freckles and spots of dull bluish-grey, appearing as if beneath the surface of the shell which is unusually lustrous. One of the most remarkable eggs of this or any other species I have seen, is in a set of two taken in company with Dr. G. Hurst, at Heathcote, New South Wales, on the 29th October, 1886. The eggs are of a deep yellowish-buff ground colour, one having a broad band of dark umber brown blotches around the centre of the egg; the other, two distinct zones formed of dark umber brown spots, one being around the centre, the other on the smaller end, the ground colour on the larger end and between the zones passing into a pale creamy-white. Length (A) 0.96 × 0.71 inches; (B) 0.95 × 0.7 inches. A set of two taken at Chatswood on the 7th September, 1898, measure:—Length (A) 0.9 × 0.7 inches; (B) 0.9 × 0.69 inches. A set of three taken in the same locality, measure:—Length (A) 0.95 × 0.67 inches; (B) 0.95 × 0.68 inches; (C) 0.94 × 0.68 inches.

A fledgeling I obtained at Eastwood, while being fed by the female, is dull rufous above and below; quills blackish-grey, the primaries narrowly edged externally with ashy-white, and the secondaries broadly margined with dull rufous; tail dull rufous. Wing 2.2 inches.

Young males resemble the adult female prior to assuming their distinguishing sexual livery. One I obtained at Roseville on the 26th June, 1902, is in almost the same stage of plumage as another procured two months later by Mr. R. Grant at Five Dock. Both specimens have the longer upper and under tail-coverts tipped with rufous; the outer series of the greater wing-coverts rufous, both webs of the innermost secondaries broadly margined with rufous. In a further advance towards maturity these rufous tips and margins are lost, the upper parts and tail have an olive-green wash, and some of the feathers on the lower breast are yellow.

August and the four following months constitute the usual breeding season of this species. In the neighbourhood of Sydney, nests with eggs are plentiful in September and October, rarer in November, and are occasionally found as late as December. On the Blue Mountains nests with eggs are common in November; evidently two or more broods are reared during the season.

Two adult males from Finnis and Mount Compass, South Australia, kindly lent by the Trustees of the South Australian Museum, are intermediate between the eastern and western species, but are more closely allied to *P. occidentalis*. From the latter they vary in the darker breast, slightly darker grey basal portion of the tail feathers and the broader and slightly darker blackish-brown subterminal band. From typical examples of *P. gutturalis*, obtained in New South Wales, they may be readily distinguished by the total absence of the olive-yellow wash on the basal portion of the tail feathers, which is a uniform dark grey.

I have distinguished this darker grey tailed form from South Australia under the name of *Pachycephala meridionalis*.^{*} It forms a connecting link between the species inhabiting New South Wales and its extreme western representative *P. occidentalis*. An adult male in the Australian Museum collection, obtained near Adelaide in June, 1887, measures—Total length 6.5 inches, wing 3.75, tail 3.2, bill 0.45, tarsus 0.88. More recently I have examined a male and female of this intermediate form in a collection of birds made on Kangaroo Island, and kindly forwarded to me for examination by the Trustees of the South Australian Museum, Adelaide. Two eggs taken at Mount Barker, near Adelaide, are of a creamy-buff ground colour, which is freckled, spotted, and blotched with rich umber-brown and a few small underlying spots of blackish-grey; the larger markings being confined, principally to the thicker end, where they are confluent and form well defined zones. Length (A) 0.9 × 0.61 inches; (B) 0.92 × 0.63 inches.

Some specimens from Western Victoria are almost similar to those from South Australia. A specimen in Mr. Edwin Ashby's collection procured at Lal Lal, Victoria, is like *P. meridionalis*, but having the faintest trace of an olive-green wash on the basal portion of the tail-feathers.

Pachycephala occidentalis.

WESTERN THICKHEAD.

Pachycephala gutturalis, (nec Lath.) Gould, Bds. Austr., fol., Vol. II., pl. 64 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 207 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 192 (1883) (male).

Pachycephala occidentalis, Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 212 (1878); Sharpe, Hand-l. Bds., Vol. IV., p. 306 (1903).

ADULT MALE—*Similar to the adult male of PACHYCEPHALA GUTTURALIS*, Gould, but having a paler yellow breast, the tail feathers grey for two-thirds of their length, without any olive wash, and the blackish-brown subterminal band much narrower than it is in that species. Total length 6.75 inches, wing 3.8, tail 3.1, bill 0.45, tarsus 0.9.

ADULT FEMALE—*Similar to the adult female of P. GUTTURALIS*, but having no olive wash on the upper parts of the body, wings, and tail; the centre of the breast, the abdomen and under tail-coverts buff.

Distribution—Western Australia.

LONG before *Pachycephala occidentalis* was separated by Dr. Ramsay from the eastern species, Gould had both figured and accurately described it in his folio edition of the "Birds of Australia," under Latham's older name of *P. gutturalis*. Dr. Gadow's description of the tail of

^{*} Rec. Austr. Mus., Vol. V., p. 126 (1904)

the adult male of *P. gutturalis* in the "Catalogue of Birds in the British Museum," "basal two-thirds of the tail grey, apical third blackish-brown, tipped with grey" is not applicable to that species but to the western form *P. occidentalis*.

Moreover, Dr. Gadow writes, "I have copied Ramsay's description of *P. occidentalis*, although the specimens from Western Australia in the Museum do not agree with his diagnosis." Canon Tristram commenting in "The Ibis"† on the Eighth Volume of the Catalogue of Birds in the British Museum refers to this passage and remarks: "We can only add, neither do our own three from Western Australia."

In a number of skins, however, in the Australian and Macleay Museum collections from Western Australia, the chief distinguishing characters pointed out by Dr. Ramsay in *P. occidentalis* are constant in adult birds of both sexes. The wing-measurement of adult males varies from 3.75 to 3.95 inches, and one specimen has the gamboge-yellow of the under surface equally rich in colour as the eastern species. Fully adult males of *P. gutturalis*, have the basal portion of the tail-feathers always more or less washed with olive-green, and which in *P. occidentalis* is of a uniform grey. Only semi-adult males of *P. gutturalis* are devoid of the olive-green wash on the tail-feathers, but by the remainder of the plumage it is evident at a glance that they have not arrived at maturity. The adult female of *P. occidentalis* is even more widely separated from the adult female of *P. gutturalis*, than are the opposite sexes of these species.

Two eggs taken near Albany, are indistinguishable from a common variety of those of *P. gutturalis*. They are of a pale creamy-white ground colour, spotted and blotched around the larger end with amber and blackish-brown and a few obsolete spots of dull violet-grey. Length (A) 0.94 × 0.65 inches; (B) 0.92 × 0.64 inches.

Pachycephala melanura.

BLACK-TAILED THICKHEAD.

Pachycephala melanura, Gould, Proc. Zool. Soc., 1842, p. 134; *id.*, Bds. Austr., fol., Vol. II., pl. 66 (1848); *id.* Hand-bk. Bds. Austr., Vol. I., p. 211 (1865); Masters, Proc. Linn. Soc., N.S.W., Vol. I., p. 49 (1877); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 185, (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 304 (1903).

ADULT MALE—*Like the adult male of PACHYCEPHALA GUTTURALIS, Latham, but differs in being richer in colour, the band on the hind neck and the breast gamboge-yellow, tail feathers entirely black, except a narrow brown edge at their tips, and having a larger bill. Total length 6.25 inches, wing 3.6, tail 2.75, bill 0.6.*

ADULT FEMALE—*Head and neck slaty-grey; back, upper tail-coverts and the basal half of the tail dark olive-green; apical half black tipped with brown, circle surrounding the eye light brown, throat dull white freckled with grey; chest dark brown; the remainder of the under surface and under tail-coverts deep yellow, lightly washed with buff; basal half of the bill dark brown, becoming almost black towards the tip; legs and feet bluish lead-colour; iris brown.*"—(Masters).

Distribution—Northern Queensland and Islands of Torres Straits, Northern Territory of South Australia, North-western Australia.

THE Black-tailed Thickhead is the northern and north-western representative of *Pachycephala gutturalis* of Eastern Australia. It is remarkable that in the northernmost parts of the continent its ally in addition to its richer plumage is furthermore distinguished by having a larger bill, while in *P. glaucura*, inhabiting Tasmania and the islands of Bass Strait, the

* Cat. Brds. Brit. Mus., Vol. VIII., p. 192. (1883).

† The Ibis, 1884, p. 398.

bill should be of decreased size. Again, however closely adult males in full plumage of *P. melanura* of North Australia and *P. occidentalis* of Western Australia, may be found after the examination of a large series collected in many intermediate localities to gradually merge into the original species and type of the genus *Pachycephala gutturalis*, there is a marked and wide divergence in the colour of the plumage of the adult females of these northern and western forms. Whether the same intergradation does take place in the latter sex I am unable to say from the scant material before me, for owing to their duller plumage, the females are as a rule, far less frequently collected than the males. In the adult female of *P. melanura*, the uniform grey breast of *P. gutturalis* is replaced with yellow, while in the adult female of *P. occidentalis* the abdomen is buff.

Of thirteen specimens obtained during the Voyage of the "Chevert," fitted out by the late Sir William Macleay in 1875, Mr. George Masters, whose original description of the adult female I have transcribed above, informs me that it was first met with at Cape Grenville, afterwards at Cape York, and was observed upon all the wooded islands visited in Torres Straits; six males and three females were obtained at Cape Grenville, two males and one female at Darnley Island, one female at Long Island and another at Bet Island. If not identical, very closely allied, is *Pachycephala robusta** obtained during the same expedition at Cape York. While at the Macleay Museum, at the University of Sydney, comparing the type with the female of *P. melanura*, Mr. Masters himself shared with me the belief that they are identical. With the female too of *Pachycephala melanura* must also be compared *Pachycephala peninsulae*. Hartert,† procured at Cape York.

Pachycephala melanura also occurs at the Gulf of Carpentaria, at Port Darwin, Port Essington, and the Daly River in the Northern Territory of South Australia; Derby, North-western Australia, and Mr. Tom Carter forwarded me an example for examination he had shot in the mangroves at North-west Cape on the 14th June, 1902. I have never seen a typical large-billed specimen of *P. melanura*, from any inland locality all being procured in the coastal districts, to which it seems to be confined, and giving preference to the mangroves. Except for being smaller and slightly richer in colour, an adult male of *Pachycephala gutturalis* obtained near Cairns, North-eastern Queensland, is barely distinguishable from an example I procured at Eastwood, New South Wales, the latter having the tail feathers entirely black except narrow brownish margins at the tips, and a very slight olive-green wash at their extreme base; the bill too being comparatively larger in the southern bird. The latter specimen is one of the exceptions to the general rule, and which I have referred to elsewhere. Both birds have black tail-feathers, but they do not belong to the large billed form *P. melanura* found in Australia only on the extreme north-eastern, northern, and north-western coastal districts.

A nest of this species, taken in the vicinity of Port Darwin, is a cup-shaped structure, externally formed of thin twigs and grasses, and lined inside with very fine black hair-like rootlets. It averages, externally four inches in diameter by two inches and a half in depth, the inner cup measuring two inches and a half in diameter by one inch and a half in depth.

The eggs were two in number, oval in form, the shell being close-grained, smooth and slightly lustrous, of a creamy-buff ground colour, with small irregular shaped spots and blotches of dark amber and brownish-black, intermingled with a few underlying markings of dull ink-grey, the markings predominating as usual at the larger end. Length (A) 0.85 × 0.65 inches; (B) 0.88 × 0.66 inches. Two eggs in the collection of Mr. C. French, Junr., taken in the neighbourhood of the Daly River in the Northern Territory of South Australia, on the 17th January, 1902, are somewhat similarly marked, and measure:—Length (A) 0.82 × 0.66 inches; (B) 0.85 × 0.66 inches.

* Proc. Linn. Soc., N.S.W., Vol. I., p. 49 (1877).

† Nov. Zool., Vol. VI., p. 423 (1899).

Pachycephala glaucura.

GREY-TAILED THICKHEAD.

Pachycephala glaucura, Gould, Proc. Zool. Soc., 1845, p. 19; *id.*, Bds. Austr., fol., Vol. II., pl. 65 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 209 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 194 (1883); Sharpe, Handl. Bds., Vol. IV., p. 306, (1903).

ADULT MALE—*Similar to the adult male of PACHYCEPHALA OCCIDENTALIS*, Ramsay, but having a shorter bill, the quills externally margined with grey, the tail entirely grey, and the under tail-coverts white slightly tinged with yellow. Total length 7 inches, wing 4, tail 3·3, bill 0·4, tarsus 0·9.

ADULT FEMALE—*General colour above ashy-brown; upper wing-coverts like the back, the greater series paler on the apical portion of their outer webs; quills dark brown externally margined with ashy-brown, and which gradually passes into ashy-white on the edges of the outermost primaries; forehead and crown of the head ashy-brown, of a slightly darker shade than the back; a line of feathers below the eye and the ear-coverts ashy-brown, the latter having whitish shaft-lines; throat dull greyish-white, indistinctly mottled with pale brown; upper portion and sides of the throat pale ashy-brown; remainder of the under surface dull ashy-white washed with fulvous; under tail coverts white.*

Distribution—Tasmania, and some of the larger islands of Bass Strait.

THE Grey-tailed Thickhead is the only representative of the genus *Pachycephala* inhabiting Tasmania, of which the adult male is distinguished by having a yellow breast. Although found on some of the larger intervening islands of Bass Strait, it is remarkable that in colour it more closely approaches the extreme western species *P. occidentalis*, than it does its ally *P. gutturalis*, which is common on the neighbouring continental mainland. From both of this species, however, *P. glaucura* may be distinguished by its distinctly shorter bill. Typically the tail feathers, too, are of a uniform grey, but among some adult males in the Australian Museum collection, obtained by Mr. K. Broadbent in Tasmania, two of them except on the lateral feathers show traces more or less of an indistinct subterminal blackish-brown band.

From Tasmania Dr. Lonsdale Holden writes me:—"The Grey-tailed Thickhead is to be found both in the damp and the dry regions of Tasmania, but I think it is more common in the latter. I used to suppose the gaudy male alone uttered the call of "twee-twee-too-it," or "see me do it," but I had lately a long and close observation of a bird in the female dress so calling, and that was in the breeding season. It is curious how seldom one detects the male of this species, he is generally high up amongst the foliage. The nest is sometimes built in high grass, and I have seen it twelve feet aloft in a native currant tree; it is neatly lined with fine hay, and the eggs are pointed at both ends. I have known the hen to sit so close as to require pushing before she would leave her eggs, though they were fresh, and to return to sit in the empty nest while I was still beside it. But the hen of this species is not generally shy, and will let you come quite close to her while she flies from tree to tree, or tree to ground, clinging to the stem like a Strong-billed Honeyeater does. The Thickheads in the breeding season are decidedly among our noisiest birds."

A nest of this species received from Mr. J. Gabriel taken on Flinders Island, Bass Strait, in November 1893, is a shallow cup-shaped structure, the walls of it being thick and the rim nicely rounded. Externally it is formed principally of dead leaves and skeletons of leaves, intermingled with narrow strips of bark, the long pliant stems of a climbing plant, and a small quantity of spider's webs; inside it is lined entirely with thin dried plant stems and wiry rootlets. It measures four inches and a half in external diameter by three inches in depth; internal diameter two inches and three-quarters, depth two inches.

The eggs are two or three in number for a sitting, varying from true to swollen ellipses in form, and tapering somewhat sharply towards each end, the shell being close grained and smooth, but dull and lustreless. Typically they are of a very faint creamy-buff or buffy-white ground colour, over which is sprinkled dots and small irregular shaped spots of umber and sepia intermingled with underlying spots or small blotches of dull violet-grey which predominate on the larger end. On some specimens the markings are in a cluster, or in lines, others have a few short darker hair lines or streaks. A set of two taken by Dr. L. Holden at Circular Head, North-west coast of Tasmania, on the 20th October, 1886, measures:—Length (A) 0.96×0.68 inches; (B) 0.93×0.72 inches. A set of three taken near Launceston, measure:—Length (A) 0.98×0.68 inches; (B) 0.97×0.68 inches; (C) 0.97×0.66 inches. Mr. E. D. Atkinson informs me that his brother the Rev. H. D. Atkinson of Evandale, has taken the eggs of this species in October and November from nests built in low scrub.

Although this species is closely allied to *Pachycephala occidentalis* and *P. gutturalis* of the Australian continent it is remarkable that its eggs in shape most resemble those of *Pachycephala olivacea*. Typically the eggs of both may be distinguished from those of any other species of *Pachycephala* by their form.

Pachycephala rufiventris.

RUFIOUS BREASTED THICKHEAD.

Sylvia rufiventris, Lath., Ind. Orn. Suppl., p. liv. (1801).

Pachycephala pectoralis, Gould, Bds. Austr., fol., Vol. II., pl. 67 (1848).

Pachycephala rufiventris, Gould, Handbk., Bds. Austr., Vol. I., p. 212 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 208 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 308 (1903).

ADULT MALE—*General colour above grey, slightly paler on the rump and upper tail-coverts; upper wing-coverts and quills blackish-brown externally margined with grey; tail feathers blackish-brown externally edged and tipped with grey; head grey, with indistinct dark brown centres to the feathers; lores, feathers above and below the eye and the ear-coverts black; chin, cheeks and throat white, followed by a crescentic black band on the fore-neck which widens at the sides with the black ear-coverts; sides of the neck pale grey, remainder of the under surface and under tail-coverts light rufous-brown; bill black; legs and feet dark slate-colour; iris black. Total length in the flesh 6.75 inches, wing 3.75, tail 2.9, bill 0.5, tarsus 0.82.*

ADULT FEMALE—*General colour above brownish-grey; lower back, rump and upper tail-coverts grey; quills and tail feathers brown externally margined with dull grey; lores brownish-white; ear-coverts brown; chin, cheeks and throat dull white, streaked with blackish-brown; remainder of the under surface buff, passing into a rich buff on the under tail-coverts; all the feathers on the breast and sides of the abdomen distinctly streaked with blackish-brown; bill brown; iris black; legs slate colour the feet slightly darker.*

Distribution.—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia.

WITH the exception of the northern and north-western portions of the continent, the Rufous-breasted Thickhead is found in favorable situations all over Australia. It chiefly frequents open forest lands and lightly timbered scrubs, and is also a close attendant on the haunts of man.

To a large extent its food consists of various kinds of insects and their larvæ, sometimes alternated, according to the season, with small wild fruits and berries. While depending partially for its subsistence on a frugivorous diet, it never attacks cultivated fruits although it freely enters

orchards and vineyards in search of insects. Most of its food is obtained among the branches of the larger *Eucalypti* and *Casuarina*, hopping along the limbs in a quiet and unobtrusive manner, and searching among the crevices of the bark for insects in a similar manner to the Grey Shrike-Thrush (*Collyriocincta harmonica*).

During the spring and summer months it is one of the first birds to usher in the morn with its lusty, bubbling melodious notes, followed by a clear whistle which is poured forth at intervals throughout the day. Often its song is uttered while perched on a moderately thick horizontal bough, one that viewed from below, little more than the bill and portion of the tail is visible. Like the preceding species, the rich and voluble notes are also poured forth almost simultaneously with any loud and sudden noise, as the discharge of a gun, or a peal of thunder, and shares with *Pachycephala gutturalis*, the name of "Thunder Bird." In the neighbourhood of Sydney, it is also locally known as the "Little Thrush" and "Ring Coachman."

The nest is an open cup-shaped structure, and usually somewhat scantily formed of long thin twigs and dried grasses, and lined inside with finer dried grasses or wiry rootlets. An average one measures three inches and a half in external diameter by two inches and a half in depth, and the inner cup two inches and a quarter in diameter by one inch and a half in depth. Some nests built in upright acute-angled forks are much thicker at the bottom; but when not too high, the eggs are often visible through the sides of the nest. One I found at Canterbury, near Sydney, built about five feet from the ground in a gum sapling, and from which I flushed a bird, had the thin wiry rootlets and thread-like *Casuarina* leaves of which it was composed, so thickly matted together with pure white cobwebs, that I mistook it for a Honey-eater's nest, and it was not until one of the three eggs it contained had been withdrawn, that I was certain of its identity. The site is usually in an upright forked branch of any suitable tree; generally a *Casuarina*, *Melaleuca*, *Syncarpia*, or *Acacia* is selected in the neighbourhood of Sydney, and its height varies as a rule from within hand's reach to fifteen feet, and occasionally as high as thirty feet from the ground. Mr. W. B. Barnard informs me that in Queensland he has found the nest of this species built among the sticks underneath the nest of the Whistling Eagle, *Haliastur sphenurus*.

Three is the usual number of eggs laid for a sitting, occasionally I found nests containing only two, and on three occasions sets of four. They are oval in form, the shell being close-grained, smooth, and lustrous. In ground colour they vary from a very pale olive to olive-brown which is freckled, spotted, or blotched with umber, sepia, and blackish-brown, intermingled with fainter subsurface markings of a similar character. In some specimens the markings are chiefly confined to a well defined zone around the larger end, but in others they are very small and sparingly sprinkled over the shell and barely distinguishable from the ground colour. In the size and disposition of their markings they vary as much as do those on the eggs of *Pachycephala gutturalis*. Typical eggs, however, may be easily distinguished from those of any other Australian species, except from those of their close ally *P. falcata*. A set of three taken at Canterbury, New South Wales, on the 1st October, 1899, measures as follows:—Length (A) 0·87 × 0·66 inches; (B) 0·85 × 0·65 inches; (C) 0·87 × 0·67 inches. A set of three taken at Chatswood, on the 3rd October, 1898, measure:—Length (A) 0·92 × 0·66 inches; (B) 0·9 × 0·65 inches; (C) 0·91 × 0·68 inches.

September and the four following months constitute the usual breeding season. In the neighbourhood of Sydney this species is a later breeder than *P. gutturalis*, and nests with fresh eggs are not uncommon until the middle of December, and may be found as late as the end of that month. They are, however, far more plentiful in October. At Chatswood I saw fledglings on the 25th January, 1899, and young birds being fed by their parents on the 6th February.

At Enfield on the 22nd December, 1897, I found a nest built four feet from the ground in a *Melaleuca*, containing three nearly fledged young, which scrambled out of the nest as I put my

hand towards them. They had the upper parts greyish-brown with dull rufous margins to most of the feathers, and the under surface white broadly streaked with smoky-brown; on each side of the crown of the head was a tuft of dusky-grey down. In young females, the last traces of immaturity are exhibited in the narrow rufous margins to the upper wing-coverts, scapulars and some of the feathers on the back.

Mr. George Savidge found a nest of this species at Copmanhurst, on the 26th October, 1896, containing three eggs, also an egg of the Pallid Cuckoo. In Goodlet's Bush near Ashfield, on the 12th December, 1896, I saw a nest of this species in a Eucalyptus in which the female was engaged in feeding a nearly fledged Pallid Cuckoo.

Pachycephala falcata.

LUNATED THICKHEAD.

Pachycephala falcata, Gould, Proc. Zool. Soc., 1842, p. 134; *id.*, Bds. Austr., fol., Vol. II., pl. 68 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 213 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 205 (1883); Sharpe, Hand-l., Bds., Vol. IV., p. 307 (1903).

ADULT MALE—*General colour above grey, slightly paler on the rump and upper tail-coverts; lesser wing-coverts like the back, the median and greater coverts, and quills brown margined externally with ashy-grey; head grey with indistinct dark brown centres; lores and feathers below the eye dusky-grey; chin and throat white, followed by a narrow crescentic black band on the fore-neck; remainder of the under surface fawn colour; under tail-coverts pale fawn colour; bill (of skin) black; legs and feet brown. Total length 5.75 inches, wing 3.4, tail 2.6, bill 0.48, tarsus 0.8.*

ADULT FEMALE—*General colour above light brownish-grey, the rump and upper tail-coverts being of a slightly clearer grey; upper wing-coverts like the back, the greater series with brown centres; quills brown, the outer webs of the primaries edged, and those of the secondaries margined with ashy-grey; tail feathers brown, narrowly edged with dull ashy-grey; lores dull whitish; feathers below the eye and the ear-coverts brown; chin and upper throat white; sides of the breast fawn colour; remainder of the under surface and under tail-coverts white, slightly tinged with fawn colour, the feathers on the fore-neck and upper breast with a narrow streak of dull blackish-brown down the centre.*

Distribution—North-western Australia, Northern Territory of South Australia, Northern Queensland.

THE range of the Lunated Thickhead, a close ally of *Pachycephala rufiventris*, extends from the neighbourhood of the Herbert River, Queensland, throughout the coastal districts of the northern portion of that State, to the Northern Territory of South Australia, and North-western Australia. There are numerous specimens in the Australian Museum collection, procured principally by Messrs. E. J. Cairn and Robt. Grant, near Cairns, Queensland, by Mr. A. Morton at Port Darwin and Port Essington, and by the late Mr. T. H. Bowyer Bower and Mr. E. J. Cairn in the neighbourhood of Derby, North-western Australia. I have also received from Mr. C. French, Junr., its nest and eggs taken near the Daly River in the Northern Territory of South Australia. Gould regarded *P. falcata* as the northern representative of *P. rufiventris*, but in the report of the "Voyage of H.M.S. Alert." Dr. Sharpe records two examples of the latter species from Port Darwin.

Some adult males have the lores, feathers below the eye and the ear-coverts, much darker than others; also those on the breast, and the crescentic band on the fore-neck is narrower in the Derby than in the Port Essington specimens. Adult females procured near Cairns, North-eastern Queensland, have the upper parts of a clearer grey than others obtained at Derby, North-western Australia; and the under surface of examples from both localities, varies considerably in the depth of the fawn coloured wash and the width and extent of the dark brown central streaks.

The nidification of *P. falcata* closely resembles that of the preceding species. A nest received from Mr. J. A. Boyd while a resident of the Herbert River, Queensland, and taken by Mr. D. Cochrane, is a frail cup-shaped structure formed entirely of fine fibrous rootlets. It was built in a low tree and contained two fresh eggs. Another nest now before me taken near the Daly River in the Northern Territory of South Australia, on the 8th January, 1902, is externally constructed of dried plant stems and fibrous roots, the inner cup being neatly but sparingly lined with very fine dried grasses and rootlets. Externally it averages four inches in diameter, depth two inches, the inner cup measuring two inches and a half in diameter by one inch and a half in depth.

In several sets received, two eggs constituted a full sitting, and in two instances the eggs were heavily incubated. They are indistinguishable from the smaller eggs of *P. rufiventris*. They are oval in form, the shell being close-grained, smooth and more or less lustrous. The ground colour varies from a pale olive to olive-brown, over which is sprinkled freckles and spots of dull amber brown intermingled with small underlying markings of faint ashy-grey, the markings predominating at the thicker end, where in some instances they form a more or less well defined zone. In two specimens now before me, the spots are chiefly distributed on a penumbral band of a slightly darker shade of the ground colour around the thicker end. A set of two taken by Mr. J. Cochrane at Cairns, Queensland, on the 17th October, 1896, measures:—Length (A) 0.82 × 0.63 inches; (B) 0.81 × 0.62 inches. Another set from the same locality, measure:—Length (A) 0.83 × 0.63 inches; (B) 0.82 × 0.64 inches. A set in Mr. C. French Junr's. collection, taken near the Daly River, in the Northern Territory of South Australia, measure:—Length (A) 0.85 × 0.64 inches; (B) 0.87 × 0.65 inches.

In the Northern Territory of South Australia the breeding season of this as with most species is during the early months of the year.

An immature male from Port Essington has the blackish-brown band on the fore-neck much broader, some feathers on the crown of the head white and a line of white feathers extending behind the eye, and meeting forms a white band on the hind-neck.

Pachycephala gilberti.

GILBERT'S THICKHEAD.

Pachycephala gilberti, Gould., Proc. Zool. Soc., 1844, p. 107; *id.*, Bds. Austr., fol., Vol. II., pl. 71 (1848); *id.*, Handbk. Bds. Aust. Vol. I., p. 216 (1865); Gadow, Cat. Bds. Brit. Mus. Vol. VIII., p. 210 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 308 (1903).

ADULT MALE—*General colour above dark grey washed with olive, less distinctly on the head and rump; upper wing-coverts like the back, the greater series with dusky brown centres and greyish-brown margins; quills dusky-brown, the secondaries externally margined with dull greyish-brown, and the primaries edged with white-brown; upper tail-coverts dark grey; tail feathers greyish-brown; lores and feathers in front of the eye black; ear-coverts dark grey; cheeks, chin and throat dull rust-red; fore-neck grey, slightly tinged with sandy-buff; centre of the breast and the abdomen sandy-buff; remainder of the under surface grey, the sides of the body slightly darker; under tail-coverts sandy-buff; "bill black; legs and feet black; iris bright red-brown."*—(Morgan). Total length 7.25 inches, wing 4, tail 3.5, bill 0.45, tarsus 0.95.

ADULT FEMALE—*Resembles the adult male but devoid of the black colouring on the lores; the rust-red patch on the chin and throat is absent, these parts being grey.*

Distribution—New South Wales, Victoria, South Australia, Western Australia.

ALTHOUGH widely distributed, Gilbert's Thickhead is the rarest species of the genus inhabiting the southern portion of the Australian continent. There are specimens in the Australian Museum collection obtained in Western and South Australia, and I have received on loan for examination a specimen from the South Australian Museum, Adelaide, obtained by the late Mr. F. Andrews on the Gawler Ranges on the 26th September, 1882, and an adult male procured at Nonning by Drs. A. M. Morgan and A. Chenery on the 5th August, 1902.

The sandy buff patch on the centre and breast of adult males is variable in size; in some it extends on to the sides of the breast and abdomen. The wing-measurement of five specimens now before me varies from 3·8 to 4·1 inches. The outer webs of the secondaries of three examples are olive-brown, in the others dull greyish-brown.

Relative to this species Dr. Morgan remarks, "*Pachycephala gilberti* seen from Nonning westward to the Gawler Ranges, but nowhere common. It has a clear whistling note like that of the other species of Thickheads but is readily distinguishable."

On Kilfera Station in Western New South Wales, the late Mr. K. H. Bennett on the 3rd November, 1886, took three fresh eggs from a nest of this species formed inside an old nest of *Pomatostomus*, built in a Mulga about twelve feet from the ground. He found it ten days before by observing the tail of the bird projecting from the old nest.

A nest received from Mr. C. French, Junr., taken on the 6th October, by Mr. Charles McLennan, on Pine Plains Station, in the Wimmera District, North-western Victoria, is an open cup-shaped, thick walled structure, and differs considerably in the lining used by other members of the genus. It is formed of thin strips and shreds of bark, and bark fibre intermingled with dried greyish-white grasses, and is lined at the bottom with white plant down. Externally it measures four inches and a quarter in diameter by two inches and a half in depth, the inner cup measuring two inches and a quarter in diameter by one inch and a half in depth. This is the only instance I have known of any species of *Pachycephala* forming a nest entirely of soft materials, typically they are made of thin twigs or strips of bark and lined with dried grasses or rootlets, and have a wiry consistency. Mr. McLennan informs me, however, that it is a typical example of the nests of this species he has found in the Wimmera District. It contained two eggs and was built in a Hop-bush (*Dodonaea viscosa*), three feet from the ground.

The eggs are usually two, sometimes three in number for a sitting, and vary from thick to elongate oval, some specimens being rather sharply pointed at the smaller end, the shell being close-grained, smooth and more or less lustrous. In ground colour they vary from pale yellowish-buff and yellowish-white to dull white, which is dotted and spotted more particularly on the larger end with blackish-brown, or light amber brown, intermingled with similar underlying markings of inky or bluish-grey. In some specimens the markings are uniformly distributed over the shell, but as a rule they are small and in the form of a band around the larger end. A set of two taken by Mr. C. McLennan, on the 6th October, 1902, at Pine Plains Station, in the Wimmera District, Victoria, measure as follows:—Length (A) 0·92 × 0·67 inches; (B) 0·95 × 0·68 inches. Another set taken by him in the same locality, measures:—Length (A) 0·95 × 0·65 inches; (B) 0·92 × 0·64 inches. A set of three taken by the late Mr. K. H. Bennett, in Western New South Wales measures:—Length (A) 0·95 × 0·73 inches; (B) 0·91 × 0·71 inches; (C) 0·93 × 0·73 inches. An egg in Dr. A. M. Morgan's collection, taken at Euro Bluff, South Australia, in October 1900, is a swollen oval in form and of a pale cream ground colour, sprinkled over, particularly at the larger end, with irregular shaped dots of blackish and dark amber brown intermingled with similar but less numerous underlying markings of faint bluish-grey. Length 0·92 × 0·72 inches. The eggs of this species more closely resemble in form those of *Pachycephala gutturalis*, and in colour and character of markings those of *Artamus sordidus*.

In Western Australia, Gilbert found a nest with young as early as the middle of August, but from the authorities quoted, September to the end of November apparently constitutes the usual breeding season in the south-eastern States.

Pachycephala olivacea.

OLIVACEOUS THICKHEAD.

Pachycephala olivacea, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 241 (1826); Gould, Bds. Austr. fol., Vol. II., pl. 73 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 218 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 212 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 309 (1903).

ADULT MALE—*General colour above dull olivaceous, slightly brighter on the rump and upper tail-coverts; upper wing-coverts like the back, the greater series dark greyish, except on the margins of their outer webs; quills dark greyish-brown, margined externally with olive: the apical portion of the outer webs of the outermost primaries narrowly edged with dull ashy-white; tail-feathers dusky-brown with a strong olivaceous wash, which is more distinct on their outer webs: head and ear-coverts dark-grey: chin and throat white with dark grey bases to the feathers, and most of them having narrow blackish-grey tips: across the chest a well defined grey band connecting with the slightly darker grey feathers at the sides of the neck: remainder of the under surface fulvous-brown washed with olive on the sides of the breast and flanks; under tail-coverts fulvous-brown with an ochreous wash; bill dark brown; legs and feet brown; "iris dull red"*—(Atkinson). *Total length in the flesh 8 inches, wing 3.85, tail 3.8, bill 1.52, tarsus 1.18.*

ADULT FEMALE—*Similar in plumage to the male, but without any grey band on the chest, which is fulvous brown like the breast; the feathers of the head have an olive brown wash.*

Distribution—Tasmania, some of the larger islands of Bass Strait, Victoria, and New South Wales.

THE type of *Pachycephala olivacea* described by Vigors and Horsfield, according to Dr. H. Gadow in the "Catalogue of Birds in the British Museum,"¹ is an adult male, and was obtained in Tasmania. The description there given agrees with Gould's figure of this species in the "Birds of Australia" and with several adult specimens received in the flesh from Mr. E. D. Atkinson of Waratah, Tasmania. There are two adult males in the Australian Museum collection, one obtained by Mr. G. Masters at the Clyde River, Illawarra District, New South Wales, 20th August, 1864, the other by Mr. J. A. Thorpe at Cambewarra Mountain in the same district, in November, 1881. Both specimens have a well defined grey collar across the chest connecting with the slightly darker grey feathers on the sides of the neck. On comparing them with the original description and Gould's figures, I concluded that it was a continental form of *P. olivacea*. Since then I have received a similarly marked adult male on loan from the Trustees of the South Australian Museum, obtained near Hobart, and one from Mr. Atkinson with a fainter indication of the grey collar on the chest. It is also slightly visible in a young bird, presumably a male, obtained in Gippsland. Apparently this grey band on the chest is a distinguishing character of the adult male. Both the Hobart and Gippsland specimens have a distinct greenish olive wash to the feathers next the dark grey feathers on the hind-neck.

In addition to the above mentioned localities in New South Wales, Mr. Robert Grant obtained specimens at Lithgow on the Blue Mountains, and Mr. L. Harrison at Mount Irvine. There are also eggs in the collection taken in the New England District.

An apparently adult female, judging by the measurements, has the greater wing-coverts and innermost secondaries margined with dull olive-chestnut. Wing 3.9 inches. Chestnut margins to the upper wing-coverts and quills are an indication of youth in most of the other Australian species of this genus.

¹ Cat. Bds. Brit. Mus., Vol. VIII., p. 212 (1885).

The undergrowth of humid mountain ranges is the favourite resort of this species, I obtained specimens of it in different parts of the Strzelecki Ranges, in South Gippsland, Victoria, and received its eggs during one of my visits to Childers, taken by Mr. Charles Mayo.

Writing from Bellerive, near Hobart, Dr. L. Holden remarks:—" *Pachycephala olivacea* is numerous enough in the north-west corner of Tasmania where the rainfall is considerable, but I have never seen it in the drier country east of the Derwent in the south. The wayfarer on the muddy track hears the note of this bird ringing out from the depth of the dripping scrub he is riding through. Both our Thickheads like thickly grown bush. If you want to find the nest of either, you had better look where the undergrowth is thickest and most involved with long grass at the bottom of the gully. I have heard the Olivaceous Thickhead in such places on the flanks of Mount Wellington but not, as I have said, in the drier more open country to the eastward of Hobart. The note of the Olivaceous Thickhead varies between two and three syllables. It is sometimes *twce-c-c-ctchow*, the last syllable loud and sharp, and sometimes *tu-wce-c-ctchow*, and occasionally you may hear one uttering a long drawn plaintive whistle like a Cuckoo's. The nest is in a bush, often a tea-tree some five feet from the ground, made of twigs, and neatly lined with dry grass and rootlets. The eggs are pointed at the thick end and might be mistaken for a variety of the eggs of *Collyriocinclla rectirostris*, but they are smaller, and the nest a smaller and neater structure. I have found it breeding in October and November."

A nest in the Australian Museum taken by Mr. R. N. Atkinson, at Waratah, Mount Bischoff, Tasmania, is a large and compactly built open structure irregularly formed externally of long coarse twigs and strips of bark and a few dead leaves, the inside which is of a deep cup shape, being neatly lined with fine dried yellowish-white grass stalks. Excepting the ends of some long straggling twigs, it averages six inches and a half in external diameter by four inches and three-quarters in depth, and the inner cup three inches and a quarter in diameter by two inches in depth. In general appearance and size it resembles more the nest of *Orcoica cristata* or *Collyriocinclla harmonica*, than that of the typical nest of a *Pachycephala*. With this nest Mr. E. D. Atkinson wrote as follows:—"The nest of *Pachycephala olivacea* I am sending you, was found here by my son Mr. R. N. Atkinson, on the 17th October, 1903, and contained on that day one egg. On the 18th he took two eggs, and going for the nest the following day, took a third. The nest was about five feet from the ground and was in a bush of *Fagus cunninghami*, as you will perceive. My brother the Rev. H. D. Atkinson of Evandale, Tasmania, informs me that he has found nests in scrub and low bushes, each with three eggs, from 24th October, to as late as the 2nd December."

The eggs are two or three in number, of a pointed ellipse or swollen oval in form, tapering sharply to both ends, the shell being close grained, dull and lustreless. They vary in ground colour from buffy-white to a light creamy-buff, over which is sprinkled dots, irregular shaped spots, and small blotches of different shades of umber, with which are intermingled underlying markings of a dull violet-grey, all predominating around the upper end where they are confluent and form ill-defined zones. Others have the surface dots and spots smaller, more rounded in form and of a dark brown or almost brownish-black hue, and the underlying markings more numerous and larger than the outer ones and of a dark violet-grey. A set of two taken by Dr. L. Holden at Macquarie Harbour, Tasmania, measure alike:—Length (A) 1·13 × 0·79 inches. A set of two measure:—Length (A) 1·08 × 0·76 inches; (B) 1·09 × 0·79 inches.

From Dr. Holden and the Rev. H. D. Atkinson's notes, September and the four following months apparently constitute the usual breeding season of this species in Tasmania, but nests with eggs were more often found in October. I received eggs taken during the same month in Childers, South Gippsland, Victoria, and there are eggs in the Australian Museum collection, taken in the New England District, New South Wales, during November 1887.

Genus **FALCUNCULUS**, Vieillot.**Falcunculus frontatus.**

CRESTED SHRIKE-TIT.

Lanius frontatus, Lath., Ind. Orn. Suppl. p. xviii. (1801).*Falcunculus frontatus*, Gould, Bds. Aust. fol. Vol. II., pl. 79 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 228 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 173 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 302 (1903).

ADULT MALE—General colour above greenish-olive, slightly brighter on the lower back, rump and upper tail-coverts; lesser and median wing-coverts grey, indistinctly margined with greenish-olive; greater wing-coverts and quills blackish-brown, broadly margined on their outer webs with grey, the outer webs of the innermost secondaries entirely grey; central tail feathers grey, the remainder blackish-brown, externally margined with grey and narrowly tipped with white, except the outermost feather on either side which is light grey with the outer web and a broad tip white; forehead, a narrow line of feathers in front of the eye, crown of the head and nape deep black, bordered below by a broad white stripe which extends above the eye along the sides of the head and meets on the nape, and followed by a broad black band commencing below and behind the eye and extending beyond the ear-coverts; a large spot behind the nostril, and a broad malar stripe, white; chin, throat, and fore-neck deep black; remainder of the under surface bright yellow slightly tinged with olive, which is more distinct on the sides of the chest; under tail-coverts bright yellow; bill black; legs and feet leaden-grey; iris rich brown. Total length in the flesh 7·5 inches, wing 3·7, tail 3·2, bill 0·65, tarsus 0·85.

ADULT FEMALE—Similar in plumage to the adult male but having the chin grey, and the throat and fore-neck greenish-olive instead of black; legs and feet pale leaden-grey.

Distribution—Queensland, New South Wales, Victoria, South Australia.



CRESTED SHRIKE-TIT.

THE Crested Shrike-Tit is freely distributed over the greater portion of New South Wales, its range extending in a northerly direction into Queensland, and south to Victoria and South Australia. It is a resident species and is particularly plentiful in the tall *Eucalypti* and sapling scrubs of the coastal districts, and nowhere is it more abundantly distributed than in the neighbourhood of Sydney. Usually it is met with in pairs, and although chiefly resorting to tall timber it is by no means a shy species, and may be seen, the male with crest erect, fearlessly searching for insects among low trees only a few feet away from an onlooker. On the highlands of the Milson's Point Railway Line, much of its food is obtained from the old moss-grown fruit trees in abandoned orchards. Stomachs of the birds I have examined contained only the remains of insects and their larvæ.

It usually utters a plaintive note several times in succession, varied by the male, more particularly during the spring, with some low but decidedly musical notes. There is but little variation in colour in specimens obtained in different parts of the continent, but some have the white stripes on the sides of the head and cheeks much broader than others. An adult male in the Australian

Museum collection obtained on Ash Island, at the mouth of the Hunter River, New South Wales, has these characters so pronounced that the usual intervening black band extending behind the eye on to the sides of the neck is reduced to a narrow line of feathers. The wing-measurement of adult males varies only from 3·6 to 3·8 inches, but there is a marked difference in the tail-measurement which varies from 3 to 3·4 inches. The figure represents an adult male.

The nests when newly built are exceedingly neat and beautiful structures. They vary in form from a deep cup-shape to an inverted cone-shape with a cup-like cavity at the top, and are as a rule slightly contracted at the rim. Outwardly they are usually composed of very fine yellowish-white inner bark of a Eucalyptus, and are lined inside with narrow strips of red stringy-bark and fine grass stalks, the outer portion being more or less coated with the pale greenish-grey lichen, *Usnea barbata*, over which is spread a moderately thick covering of pure white web and egg-bags of spiders. An average cup-shape nest measures externally three inches in diameter by three inches in depth, the inner cup measuring at the rim two inches, and in depth two inches. The nest figured on Plate A 10, is of inverted cone form, and was taken at Belmore on the 22nd September, 1898. Of six nests now before me, two are of an inverted cone-shape similar to the one figured, and four are of the deep cup-shape. They are built at or near the junction of a two or more pronged thin leafy upright branch, the bark of which is bitten away by the bird with its powerful bill, so as to more securely attach the structure. This species has also a curious habit of biting off the tips of the leafy twigs above the nest, generally to a uniform height and for a space averaging eighteen inches in diameter. The nests are built in the topmost twigs of a long slender branch of a Eucalyptus or gum sapling, at a height varying usually from twenty to fifty feet, although I have occasionally found them higher, and in one instance, on the 4th November, 1893, at Belmore, at an altitude of fully one hundred feet. This nest was situated in the topmost leafy twigs of a huge gum tree, and my attention was drawn to it by seeing the male either bringing material or food for young ones, to the female, who was sitting in the nest. Apparently the latter was finished, although the female, frequently shifted herself as if paying attention to young ones or was occupied in the construction of the nest. In the same locality a nest containing three fresh eggs was taken on the 28th November 1894, and two nests found on the 10th and 18th December following containing respectively three and two young ones, also a nest with three fresh eggs on the 3rd October, 1896. Two nests started by the same pair of birds were destroyed by cutting off the leaning branches in which they were built, both being in inaccessible positions. Mr. D. Swift brought me two nests he had taken at Kingsgrove, on the 11th and 21st September, 1897, the former contained one fresh egg which was broken in lowering the branch in which the nest was built, the latter three fresh eggs. In both instances the nest was built in a Narrow-leaved Ironbark, one at thirty and the other at twenty feet from the ground. At Chatswood, a nest I had under daily observation, in September and October 1898, was built in the topmost lofty twigs at the end of a long slender upright branch of a Rough-barked Apple Tree (*Angophora intermedia*). Three weeks elapsed from the commencement of the nest until the female began to sit. At Belmore I have known birds after being robbed of their eggs to construct and complete another nest in ten days.

At Roseville I found a nest on the 16th September 1900, built in an inaccessible position in an *Angophora*. Although the nests of this species are by no means common, they are easily found when one knows where to look for them, and the birds are located in the breeding season. The difficulty is to secure them, and this as a rule can only be done by cutting off the branch and gently lowering the structure, a feat not easily accomplished in the topmost branches of a tree. A nest at Chatswood Mr. C. G. Johnston had been watching, in which the female had been sitting for several days, was after an hour's work spent in lowering it from the topmost branches of a tall *Angophora intermedia*, found to be empty. Mr. S. W. Moore had a similar experience with a nest built in the top of a sapling at Eastwood. The latter nest is now in the Group Collection of the Australian Museum.

The eggs are usually three, sometimes only two in number for a sitting, elongate oval in form, the shell being close-grained, smooth and lustreless. They are white, over which is sprinkled dots, freckles, and irregular shaped spots of pale brown, brownish and slaty-black and inky-grey, the markings predominating at the larger end, where they frequently assume the form of a well defined zone, some specimens also having short irregular streaks or hair-lines. In others, the markings are almost invisible, consisting of fine pepper and salt dustings of slaty and brownish-black, while specimens may be found with bold bran-like markings and blotches of the same colours intermingled with underlying spots of slaty-grey, the latter somewhat resembling a variety of the eggs of the introduced House Sparrow (*Passer domesticus*). At set of three taken at Canterbury, on the 3rd October, 1896, measures:—Length (A) 0.98 × 0.68 inches; (B) 0.94 × 0.67 inches; (C) 0.98 × 0.67 inches. Another set of three taken in the same locality on the 21st September, 1897, measures:—Length (A) 0.92 × 0.65 inches; (B) 0.91 × 0.66 inches; (C) 0.92 × 0.67 inches.

Two broods are probably reared during the breeding season, which commences in August, and lasts until the end of December or middle of January. At Harcourt near Canterbury, New South Wales, I saw two young ones on the 31st December, 1893, being fed by their parents, also two more at Eastwood on the following day. The notes of the young ones resemble the alarm notes of the Yellow-breasted Robin (*Eopsaltria australis*).

Falcunculus leucogaster.

WHITE-BELLIED SHRIKE-TIT.

Falcunculus leucogaster, Gould, Proc. Zool. Soc., 1837, p. 144; *id.*, Bds. Austr., fol., Vol. II., pl. 80 (1848); *id.* Hand-bk. Bds. Austr., Vol. I., p. 228 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 174, (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 302 (1903).

ADULT MALE—*General colour above yellowish-olive, slightly brighter on the lower back, rump and upper tail-coverts: upper wing-coverts blackish-brown externally margined with yellowish-olive, passing into yellowish-white on the apical portion of the greater series; quills blackish-brown, margined externally with yellowish-olive, a narrow edge on the apical portion of the outermost primaries and the tips of the innermost secondaries almost pure white: central tail feathers yellowish-olive, the remainder blackish-brown externally margined with yellowish-olive and narrowly tipped with white, except the outermost feather on either side which is light brownish-grey with the outer web and a broad tip white; feathers above the eye, crown of the head and centre of the nape white, followed by a broad black band commencing below and behind the eye and extending on to the sides of the neck, and bordered below by a broad white stripe; chin, throat and fore neck black; chest bright yellow, lower portion of the breast and the abdomen white; bill black: "legs and feet greenish-blue: iris wood brown."*—(Gould). Total length 6.8 inches, wing 3.5, tail 3.3, bill 0.6, tarsus 0.8.

ADULT FEMALE—*Similar in plumage to the male but having the chin, throat, and fore neck dark grey washed with olive-green, instead of black.*

Distribution—Western Australia.

THE present species is an inhabitant of the south-western portions of the continent, representing there *Falcunculus frontatus* of Eastern Australia, and from which it may be distinguished by its white lower breast and abdomen, and the olive-yellow margins to the quills and tail-feathers. There are specimens in the Australian Museum collection obtained by Mr. George Masters, at King George's Sound, and Mongup, Salt River, Western Australia in 1869. Mr. Master's observations on this species bear out what Gould has already remarked of it in his "Handbook to the Birds of Australia" that "the habits in fact of the White-bellied and Frontal Shrike-Tit are so closely similar, that a further description is unnecessary. Gilbert

while staying in the Toodyay District in the month of October, found the nest of this species among the topmost and weakest perpendicular branches of a *Eucalyptus*, at a height of fifty feet; it was of a deep cup-shaped form, composed of the stringy-bark of the gum tree, and lined with fine grasses, the whole matted together externally with cobwebs.*

A set of three eggs in Mr. G. A. Keartland's collection taken by Mr. E. J. Harris, near Bunbury, Western Australia, are oval in form, one specimen being slightly elongated and somewhat sharply pointed at the smaller end, the shell being close-grained smooth and lustreless. They are almost pure white, over which is sprinkled dots and spots of slaty-grey, slaty-black and sepia, the markings predominating at the larger end, where on two of them are fairly well defined zones; on the other the principal markings are in the form of small blotches, which are irregularly scattered over the larger end. Length (A) 0.89 × 0.64 inches; (B) 0.9 × 0.62 inches; (C) 0.97 × 0.67 inches. The eggs of this species are indistinguishable from those of the Eastern Australian representative of this genus, *Falcanucus frontatus*.

Genus OREOICA, Gould.

Oreoica cristata.

CRESTED BELL-BIRD.

Turdus cristatus, Lewin, Bds. New Holl. pl. 9 (*test* Gould).

Oreoica gutturalis, Gould, Bds. Austr., fol., Vol. II., pl. 81 (1848).

Oreoica cristata, Gould, Handbk. Bds. Austr., Vol. I., p. 231 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 174 (1883); Sharpe, Handl. Bds., Vol. IV., p. 303, (1903).



CRESTED BELL-BIRD.

ADULT MALE—*General colour above brown: wings brown, the basal portion of the innermost primaries indistinctly edged on the outer web with dull yellowish-green, the innermost secondaries margined with ochry-brown: upper tail-coverts brown, indistinctly margined with buffy-fawn: tail feathers dark brown margined externally with dull wax-yellow; fore part of the head and a broad stripe down the centre extending beyond the nape black; sides of crown grey; ear-coverts and sides of neck brownish-grey; a large loreal patch white; chin and upper portion of the throat white, bordered by a line of black feathers extending from the gape below the eye and joining with the black feathers of the lower throat: fore neck and chest brownish-black; centre of the breast and abdomen white; sides of breast greyish-brown, tinged with sandy-buff; flanks, vent and under tail-coverts sandy-buff; bill*

black; legs and feet dark horn colour: iris bright orange. Total length in the flesh 9 inches, wing 4.2, tail 3.3, bill 0.7, tarsus 1.

ADULT FEMALE—*Resembles the male, but has the forehead, lores, and feathers below the eye and cheeks brown: centre of the upper throat dull white, and the fore neck and chest brown.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western and North-western Australia.

* Gould, Handbk. Bds. Austr., Vol. I., p. 230. (1865).

IN favourable situations the Crested Bell-bird is distributed over the greater portion of Australia. In New South Wales it gives decided preference for inland open forests and belts of timber growing on the plains, and does not occur near the coast. Its food consisting of various kinds of insects and their larvæ is obtained either on the ground, over which it proceeds in a similar manner as *Collyriocinclia harmonica*, or among the larger branches of trees.

The powers of ventriloquism of this bird are truly wonderful. Its singularly low, mournful and plaintive note, now rising, now falling, appears to be a long way off, and it is not until it has reached its fullest and highest bell-like tones, that one may discover the bird perched motionless on a branch only a few yards away. I first heard the note of this bird at Yendon in Victoria, when otherwise only the hum of insects broke the stillness of a sultry afternoon in November. It appeared to be some sixty yards in front of me, arriving at the spot, it seemed to be the same distance at the back of me. Eventually the bird was discovered sitting motionless on a lateral dead branch of a gum tree, close to where I first heard it calling.

Mr. G. A. Keartland writes me as follows:—"Oreoica cristata is a solitary bird, and excepting breeding time, even avoids the company of its mate. Although I frequently saw these birds throughout the rambles of the Horn Scientific Expedition in Central Australia, from Macumba Creek in the south to Alice Springs in the north, and as far as Glen Edith westward, I only once observed a pair in company. It was soon after sunrise, and they were hopping over the ground in a very pert lively manner in quest of insects. With crests erect they occasionally gave forth their monotonous note as they moved from place to place quite regardless of my presence. That they are indifferent to the proximity of water is evidenced by the fact that during the trip of the Calvert Exploring Expedition across the Great Desert of the north-west, we frequently passed a dozen nests in a day. They were open cup-shaped, built of small twigs or grass stems and placed in the fork of a sapling, usually about four feet from the ground. The *Oreoica* is a wonderful ventriloquist. On one hot day (16th October, 1896) a male bird alighted amongst the foliage of a tree within eighteen feet of where we were lying under our tarpaulins and kept us all amazed by the manner in which he threw his notes in various directions. Sometimes a low soft note came from the east and the next moment a loud one was heard from the north, from a spot where there was nothing but bare sand. At other times the sound was heard close to our faces. He thus occupied himself for over an hour, when he was accidently disturbed. Although I have occasionally seen or heard it as far south as Melton in Victoria, it is much more at home in the arid portions of Central and Western Australia."

It is particularly plentiful in the neighbourhood of Wellington and Dubbo, and Mr. E. H. Lane has found a large number of its nests during the many years he has occupied Wambalangang Station, distant about twenty miles from the latter town. The late Mr. K. H. Bennett, writing in 1889, remarks:—"When Yandembah Station was first occupied in 1864, *Oreoica cristata* was plentifully dispersed throughout the clumps of timber and scrubby sand-hills scattered over the plain, but for the past eight or nine years it has entirely disappeared. It might be thought that the occupation of the country would account for its absence, but if so, it is hard to reconcile this cause with its constant presence in the well stocked and timbered back country some fifty miles away, where it always has been, and is still numerous."

Writing from Broken Hill, in south-western New South Wales, Dr. W. Macgillivray remarks:—"I have not noted this bird myself, as the country is unsuitable to its habits within easy reach of Broken Hill. Mr. Gayer found numbers of them on his trip. He states that the birds were numerous, and their nests quite common. The nest was usually placed in the fork of a mulga or on a horizontal branch from three to ten feet from the ground. It was very perfectly made of strips of bark lined with fine rootlets. One contained, or was rather decorated with a lot of dead caterpillars."

From South Australia Dr. A. M. Morgan sends me the following note:—"During a trip taken by Dr. Chenery and myself to the Mount Gunson District, from Port Augusta, in August

1900, *Oreoica cristata* was a very common bird in the scrub, and its note was to be heard from sunrise to sunset. At Arcoona on the 8th August, the only nest was found, in which the female was sitting on a cracked and dried up egg. The nest was built in an old one of *Pomatostomus superciliosus*, and the lining much resembled that of the nest of *Collyriocincla harmonica*."

In 1894 during the journey of the Horn Scientific Expedition, Mr. G. A. Keartland met with it in Central Australia, and again in 1896 in North-western Australia, while a member of the Calvert Exploring Expedition, when it was observed from Mullawa to the Fitzroy River. Specimens obtained by him in North-western Australia are very much paler than examples procured in the south-western portion of the continent, and the breast and abdomen are white with only a slight wash of sandy-buff on the sides. Wing 4 inches.

Writing from Point Cloates, North-western Australia, Mr. Tom Carter remarks:—*Oreoica cristata*, is a common species both on the coast and inland. In the winter months numbers of these birds may be heard uttering their ventriloquial notes all day long. They nest from June to September. I have taken their eggs as early as the 11th June, and I have seen the male bird assisting in the task of incubation. When disturbed he slipped quietly off the nest, and getting a few yards away commenced to call. It is usual to find hairy caterpillars in the nests of this species."



NEST OF CRESTED BELL-BIRD.

The nest is of a deep cup-shape, and is irregularly formed externally of long thin sticks and twigs, the inner wall being formed of strips of bark, and the cup-like cavity is neatly lined with finer strips of bark and fibrous rootlets. Usually it is built in a forked branch, or between thin branchlets and the trunk of a tree, sometimes on the top of a hollow stump, when it is formed of bark and stems of fibrous roots only, at a height varying from three to thirty feet from the ground. In Western Australia, Gilbert found it built in Grass-trees (*Xanthorrhæa* sp.) both in the crown among the leaves, or in the fork of the trunk. As will be seen by Dr. Morgan's note, it also relines the abandoned nest of another species.

The nest figured was taken by Mr. E. H. Lane on Wambangalang Station. The structure proper, exclusive of the long thin straggling twigs which stand out at all angles around it, measures externally five inches in diameter by six inches in depth, and the inner cup four inches by two inches and a half in depth. During October and November 1882, Mr. Lane found seven nests containing eggs. In each instance the nest was built between the trunk of a ring-barked tree, and at the base of newly formed limbs growing from under the ring mark, the nest averaging from three to four feet from the ground.

The eggs are two or three in number for a sitting, oval in form the shell being close-grained smooth, and almost lustreless. Typically they are of a faint bluish-white ground colour, but

they vary from almost pure white, to in rare instances, a deep bluish-white, and have rounded black dots, and spots, or large irregular-shaped blotches intermingled with others of a bluish or inky-black hue. In some specimens the markings are small and evenly distributed over the shell, in others they are larger but less numerous, forming confluent patches in places, in others they predominate on the thicker end, but seldom assume the form of a zone. Of the latter type is a set now before me, having an interwoven wreath on the larger end formed of ill-shaped black figures, crescents, and short hair lines, the remainder of the shell being entirely devoid of markings. A set of three taken by Mr. Edward Lord Ramsay, on the 28th September, 1887, at Louth, New South Wales, measures:—Length (A) 1·03 × 0·79 inches; (B) 1·07 × 0·8 inches; (C) 0·97 × 0·77 inches. A set of three taken by Mr. E. H. Lane on Wambangalang Station, near Dubbo, in October, 1892, measure:—Length (A) 1·12 × 0·83 inches; (B) 1·1 × 0·8 inches; (C) 1·12 × 0·82 inches.

Mr. C. G. Gibson informs me that in 1905, he found nests being built in the Eriston District, Western Australia, on the 12th August; two others, each with three young ones, on the 30th August and 2nd September; and on the 9th September, one with two considerably incubated eggs. One nest was built in the fork of a sandalwood tree, the others in the tops of hollow stumps.

Young birds resemble the adult female, but have the feathers on the fore neck distinctly streaked with white, and the upper tail-coverts sandy-buff. Immature males have an admixture of brownish-grey feathers in the gorget-shaped marking on the lower throat and breast, and which is not so dark or well defined as in the adult male.

From September to December constitutes the usual breeding season in New South Wales and Queensland, but the late Mr. K. H. Bennett took a set of three eggs at Ivanhoe in Western New South Wales, on the 19th March, 1887. In Central Australia, Mr. C. Ernest Cowle took, after recent rains, eggs in March and April, and in North-western Australia Mr. T. Carter noted nests with eggs from June to September.

Family CERTHIDÆ.

Genus CLIMACTERIS, *Temminck*.

Climacteris picumnus.

BROWN TREE-CREEPER.

Climacteris picumnus, (Temm.), Vig. and Horsl., Trans. Linn. Soc., Vol. XV., p. 295 (1826); Temm., Pl. Col. 281, fig. 1; Sharpe, Handl. Bds., Vol. IV., p. 357 (1903).

Climacteris scandens, (nec Temm.) Gould, Bds. Austr., fol., Vol. IV., pl. 93 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 598 (1865).

Climacteris leucophaea, Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 336 (1883).

ADULT MALE—*General colour above earth-brown, slightly richer in colour on the rump and upper tail-coverts; upper wing-coverts like the back, some of the outer greater coverts with darker brown centres; quills brown, blackish-brown at the base, all but the two outermost primaries and the two innermost secondaries crossed in the centre with a broad band of buff, the third, fourth and fifth primary having this band on the inner web only, which is succeeded by another of blackish-brown; tail feathers brown crossed with a sub-terminal band of blackish-brown, narrower towards the central pair, where it is reduced to a large oval spot of dull blackish-brown, the tips of the inner webs slightly paler; forehead, crown of the head, nape, and hind-neck dull greyish-brown, paler at the sides; lores*

blackish; a broad superciliary stripe, feathers below the eye and the ear-coverts fawn colour, the apical portion of some of the latter with dark brown margins; chin, cheeks and upper throat pale buff, the apical portion of the feathers at the base of the latter spotted with blackish-brown; a broad band across the fore neck and chest greyish-brown; remainder of the under surface buffy-brown passing into a clear buff on the flanks, each feather with a broad dull white central stripe bordered on either side with a narrow line of black; under tail-coverts dull white, margined with rich buff and conspicuously barred with blackish-brown; bill greyish-black; legs and feet dusky-grey; iris blackish-brown. Total length in the flesh 7.2 inches, wing 3.8, tail 2.7, bill 0.65, tarsus 0.9.

ADULT FEMALE—Differs in plumage from the male in having the tips of the feathers at the base of the upper throat margined at the sides with dull chestnut.

Distribution—Queensland, New South Wales, Victoria, South Australia.

TEMMINCK figured and described this species in his "Planche Coloriées,"³ also on the same plate figured another well known Australian Tree-creeper, *Climacteris scandens*. As I pointed out in 1896,¹ Gould in his folio edition of the "Birds of Australia," and also in his "Handbook," unfortunately transposed these specific names. The birds figured by Gould under the name of *Climacteris scandens*, and vernacularly as the Brown Tree-creeper, are in reality the true *C. pinnatus* of Temminck, the present species.

The Brown Tree-creeper is freely dispersed over southern Queensland, nearly the whole of New South Wales, Victoria, and some parts of South Australia. It evinces decided preference for sparsely timbered forest lands, with open grassy glades, and partial clearings in mountain ranges, situations favourable for procuring an abundant supply of insects and their larvæ, which constitute its food. In the coastal districts this Tree-creeper is met with singly, or in pairs, traversing the perpendicular trunks of the large *Eucalypti* with the greatest ease, and occasionally engaged in searching for small beetles, spiders, and ants on the grassy sward beneath some wide spreading tree. As a rule it commences at the base of a large tree trunk, and working quickly round in spiral curves, or in a zig-zag manner, soon reaches the larger branches, and after subjecting them to a hurried examination, flies off, and commences similar operations again at the foot of another tree. Although it runs over the trunk of a tree with wonderful speed, it stops ever and anon to pry into the nooks and crevices of the roughened bark, and among others, many a wood-borer or timber destroying insect is captured. The undoubted good this, and all other species of the genus do in ridding our valuable timber trees of many injurious insect pests should ensure for them absolute protection.

The late Mr. K. H. Bennett writing from Mossgiel, New South Wales, remarked:—"The Brown Tree-creeper is an extremely common bird in some localities in this district, but only where large gum or box trees abound, such as the banks of rivers, and which appear essential to its existence. In the timbered back country it is exclusively confined to the box clumps dotted here and there, and is never found in the surrounding forest of *Casuarina*, *Myoporum*, and other trees, its place being there taken by *Climacteris erythrolops*."

Mr. George Savidge sends me the following note from Copmanhurst, Clarence River:—"On the 25th October, 1896, I saw a Brown Tree-creeper dart from a stump and capture a passing insect, after the manner of the Flycatchers, and then return to the stump. It is evident therefore that this species obtains some of its food on the wing."

Mr. E. H. Lane writes me:—"Although the Brown Tree-creeper is very common in the Dubbo District, its nesting place is not so easily found. This is owing to the habit of the bird prying into almost every hollow that comes in its way, thus misleading one and causing many fruitless climbs, unless one sees it carrying building material for its nest. I have found several

* Pl. Col., 281, fig. 1.

† Town and Country Journal, Sydney, October 24th, 1896.

nests, down the hollows of old posts of dismantled huts, as well as in the round corner posts of old fences. Two or three eggs are laid for a sitting, more often the latter number."

The decaying limb of a tree, usually a *Eucalyptus*, of which a portion has rotted or broken off leaving a hollow spout, is the nesting site generally selected, at the bottom of which a slightly cupped mattress is formed of opossum or rabbit fur, intermingled in some instances with dried grasses. At Ashfield, on two occasions, I found their nests built in thick trunks of trees, to which the birds in each instance, gained access through narrow clefts. The nesting sites vary from a few feet to forty and fifty feet from the ground. At Dobroyde, in November 1889, a pair of birds I had under daily observation reared their young in a nesting place in the trunk of a tree ten feet from the ground and close to a well frequented road.

The eggs are two or three in number for a sitting, oval or rounded oval in form, the shell being close-grained, smooth, and slightly lustrous. They are of a reddish-white ground colour which is almost obscured with freckles and mottlings of different shades of red and purplish-red. Typically the markings are uniformly distributed over the surface of the shell, in some they are larger and more numerous on the thicker end, where intermingled with a few underlying spots of dull violet-grey, they form small confluent patches; but only in rare instances do they assume the form of a well defined zone. There is a great variation in their size, even in eggs belonging to the same set. A set of two taken by Mr. James Ramsay, at Tyndarie, on the 24th August, 1879, measure as follows:—Length (A) 0.93 × 0.74 inches; (B) 0.95 × 0.73 inches. A set of two taken by Dr. E. P. Ramsay, at Macquarie Fields, measure:—Length (A) 0.87 × 0.68 inches; (B) 0.9 × 0.72 inches. A set of three taken near the Dawson River, Queensland, on the 9th October, 1892, measure:—Length (A) 0.86 × 0.71 inches; (B) 0.85 × 0.7 inches; (C) 0.75 × 0.66 inches.

Immature birds resemble the adults, but the white stripe down the centre of the feathers on the under parts is ill-defined, and the sides of the breast and the under tail-coverts are slightly washed with dull rufous. Wing 3.4 inches.

August and the four following months constitute the usual breeding season of this species.

Climacteris scandens.

WHITE-THROATED TREE-CREEPER.

Climacteris scandens, Temm., Pl. Col., 281, fig. 2; Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 337 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 357 (1903).

Climacteris picumnus, (nec Temm.) Gould, Bds. Austr., fol., Vol. IV., pl. 98 (1848).

Climacteris leucophaea, Gould, Handbk. Bds. Austr., Vol. I., p. 605 (1865).

Climacteris pyrrhonota, Gould, Proc. Zool. Soc., 1867, p. 976; Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 339 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 357 (1903) (*immut.*)

ADULT MALE—General colour above olive brown, being of a clearer olive on the back: rump and upper tail-coverts dark grey: upper wing-coverts dark brown: quills dark brown, greyish-brown at the tips and on both webs of the innermost secondary, all but the latter and the outermost primaries crossed in the centre with a pale fawn band being richer in colour near the shaft of the inner web: the central pair of tail feathers dark grey, the remainder greyish-brown, crossed with a broad subterminal band of blackish-brown, and tipped with white on the inner web, the tip being larger and the band paler on the outermost feather on either side: feathers of the forehead and crown of the head blackish-brown, with pale olive-brown margins, giving these parts a scaly appearance: lores and small feathers below the eye white with blackish-brown tips: ear-coverts dark brown with a whitish central streak and olive-brown tips: chin, cheeks, throat, fore neck, centre of the breast and the abdomen white: the fore neck

slightly tinged with creamy-buff, which becomes more pronounced on the centre of the breast and abdomen; feathers on the sides of the breast and flanks olive-brown with a broad stripe of dull white down the centre, bordered with dull blackish-brown; under tail-coverts white with several blackish-brown cross-bars, broken in the centre and having a narrow white shaft line; bill black, base of the lower mandible pearl-grey; legs and feet greyish-black; iris blackish-brown. Total length in the flesh 6.5 inches, wing 3.5 tail 2.5, bill 0.75, tarsus 0.88.

ADULT FEMALE—Similar in plumage to the male, but distinguished by having a conspicuous orange-red spot just below the ear-coverts.

Distribution—Southern Queensland, New South Wales, Victoria, South Australia.

IN favourable situations the White-throated Tree-creeper is distributed over southern Queensland, the greater portions of New South Wales and Victoria, and some parts of South Australia. It is equally as numerous as the preceding species in the neighbourhood of Sydney, and which it closely resembles in habits and the manner of obtaining its food. Preference is shown by this Tree-creeper for the smooth barked species of *Eucalyptus* and *Angophora*, and it frequents trees growing quite close to the coast. The Brown Tree-Creeper although occasionally found in a similar situation, is more abundantly distributed on the rough barked open forest lands a few miles inland. The White-throated Tree-creeper has a curious habit after alighting at the base of a tree of throwing the head well back and remaining motionless for a few seconds before commencing to ascend the tree. It utters a shrill "pink, pink, pink," varied by a succession of other notes. I had in captivity a male Satin Bower-bird which could imitate the former notes of this species to perfection.

There is but little variation in many specimens in the Australian Museum collection obtained in various parts of New South Wales, those procured in the cold mountainous districts near Cooma, being slightly larger than specimens taken near Sydney, a specimen obtained at Mount Lofty near Adelaide being slightly larger than the Cooma specimens. Examples received on loan from Mr. Edwin Ashby, procured at the Black Spur, and in the Ballarat District, Victoria, also a specimen received on loan from the Trustees of the South Australian Museum obtained twelve miles west of Port Victor, South Australia, are of average measurements.

In the "Catalogue of Birds in the British Museum,"* Dr. Gadow refers to a north-eastern race "obtained near Moreton Bay, Queensland, with a well pronounced pale grey collar across the fore neck," and of slightly smaller dimensions. These characters are more strongly emphasised in specimens obtained by the late Mr. T. H. Bowyer Bower, at Scrubby Creek, near Herberton, and by Messrs. Cairn and Grant at Boar Pocket near Cairns. In his "Tabular List of Australian Birds," Dr. Ramsay in 1888, separated this smaller northern form, under the name of *Climacteris leucophaea minor*† This smaller species, which has the chin and upper throat only white, with a pale grey or greyish-brown band across the chest, Mr. R. Grant informs me, frequents the thick scrubs only and is not found in open forest lands. More recently Dr. Reichenow has also described an apparently similar specimen‡ under the name of *Climacteris weiskei*, which he stated was allied to *Climacteris pyrrhonota*. As is well known to Australian ornithologists, and has been for many years past, the latter is only the immature plumage of the present species.

For the purpose of breeding the White-throated Tree-creeper selects a hole in a decaying limb of a tree or a hollow spout, and the eggs are deposited in an open nest of hair or fur. At Mount Lofty near Adelaide, Mr. W. White used to obtain the eggs of this species by nailing up a number of hollow limbs in the trees surrounding his house, one or more of which would be quickly tenanted in the breeding season by a pair of these birds. Mr. White forwarded me an egg

* Cat. Bds. Brit. Mus., Vol. VIII, p. 337 (1883).

† Tab. List Austr. Bds., Addenda, p. 2 (1888).

‡ Orn. Monatsb., VIII, p. 187, (1900)

§ Tab. List Austr. Bds., Note opp. p. 15 (1888)

from a set of three taken from one of these nesting sites, on the 4th October, 1887. At Chatswood Mr. A. Johnston saw a pair of birds leaving a small upright hollow limb of a thin stemmed gum tree, which broke off when he caught hold of it. Later on I reached this nesting place which was about ten feet from the ground and down the main green stem of the tree, by standing on the shoulders of Messrs C. G. and A. Johnston. With the aid of a small scoop I managed to draw up two fresh and slightly bark-stained eggs which were lying on a scanty nest of opossum fur. I saw two sets, one of two, the other of three eggs, in the collection of the late Mr. H. G. Evered of Melbourne. He informed me that he had taken both sets from nests built under large pieces of the partially detached bark of dead gum trees at a height of about six feet from the ground. Both were found on Gulpha Station, near Mathoura, New South Wales; one during December, 1892, and the other in the same month of the following year.

The eggs are two or three in number for a sitting, oval or elongate-oval in form, the shell being close-grained, smooth and lustreless. They are of a dull white ground colour which is marked, but particularly on the larger end, with a few rounded spots and dots varying from a dark reddish-brown to purplish-black. Some specimens have the markings very small and of irregular shape, others are almost devoid of any. Typically they more nearly resemble one of the many varieties of eggs of the White-plumed Honey-eater (*Ptilotis pameillata*), and may be easily distinguished from those of any other species of Tree-creeper. A set of two taken at Chatswood, on the 23rd October, 1898, measure as follows:—Length (A) 0·84 × 0·65 inches; (B) 0·85 × 0·68 inches. A set of two taken by Mr. John Ramsay at Macquarie Fields, measure: Length (A) 0·85 × 0·67 inches; (B) 0·85 × 0·66 inches.

September and the four following months constitute the usual breeding season of this species.

Young birds just prior to leaving the nesting place resemble the adults, but have the forehead and crown of the head dull dark brown without any paler margins to the feathers, the rump and upper tail-coverts are dull greyish-brown with an indistinct dark brown subterminal cross-bar, a few of the feathers having dull rufous tips; on the underparts some of the feathers on the sides of the breast are indistinctly streaked with buffy-white. Wing 1·9 inches.

Immature birds have narrow indistinct blackish-brown margins and white shaft lines to the greater wing-coverts, a few of the feathers on the back having also white shaft lines, the rump and upper tail-coverts are rich rusty-red and the dull white streaks to the feathers on the sides of the breast are narrower and irregularly formed. Wing 3·4 inches. Traces of the rusty-red colour on the rump or upper tail-coverts, may be found more or less in birds otherwise in full adult plumage.

Climacteris melanura.

BLACK-TAILED TREE-CREEPER.

Climacteris melanura, Gould., Proc. Zool. Soc., 1842, p. 138; *id.*, Bds. Austr., fol., Vol. IV., pl. 97 (1848); *id.*, Handbk. Bds. Aust. Vol. I., p. 604 (1865); Gadow, Cat. Bds. Brit. Mus. Vol. VIII., p. 334 (1883); Sharpe, Handl. Bds., Vol. IV., p. 357 (1903).

ADULT MALE—*Forehead and crown of the head smoky-brown; nape, hind-neck and mantle dull chocolate-brown, passing into brownish-black on the scapulars, back, rump, and upper tail-coverts; upper wing coverts and innermost secondaries like the back, remainder of the quills dark brown crossed in the centre with a conspicuous band of rich buff, except on the edge of the outer webs of the secondaries, the band becoming paler towards the outer primaries, which have the outer webs dark brown; tail feathers brownish-black; ear-coverts brownish-black with narrow buffy-white shaft stripes; cheeks and sides of the neck dull chocolate-brown; feathers on the chin and centre of throat white with broad black*

margins; remainder of the under surface ferruginous-brown, passing into brownish-black on the sides of the lower breast and flanks; under tail-coverts brownish-black, some of the longer feathers irregularly barred or streaked with white at the tips; bill (of skin) brownish-black; legs and feet brownish-black. Total length 6.5 inches, wing 3.9, tail 3, bill 0.6, tarsus 1.

ADULT FEMALE—*Similar in plumage to the adult male but having the chin and throat pure white, and the feathers of the lower throat broadly margined with reddish-brown.*

Distribution—North-western Australia, Northern Territory of South Australia, and Queensland.

THE range of the Black-tailed Tree-creeper is principally over the northern and north-western portion of the continent. There are a number of skins in the Australian Museum collection, obtained by Mr. A. Morton at Port Darwin and Port Essington, in the Northern Territory of South Australia, one procured by the first successful Transcontinental Expedition under the leadership of the late Mr. John McDouall Stuart; specimens from Derby, North-western Australia, obtained by Mr. E. J. Cairn and by the late Mr. T. H. Bowyer Bower. I also received for examination seven specimens procured by Mr. G. A. Keartland in 1896-7, at the junction of the Fitzroy and Margaret Rivers in the same district, while a member of the Calvert Exploring Expedition, and who sent me the following information:—"The loud notes of *Climacteris melanura* were frequently heard along the course of the Fitzroy River, from its junction with the Margaret River right into Derby. The birds are very shy and difficult to approach; in other respects their habits are much like those of the Brown Tree-creeper, and their nests are usually found in the hollow branches of the larger *Eucalypti*." In Eastern Australia it occurs at the Gulf of Carpentaria, and two hundred miles farther south it was met with by Dr. W. Macgillivray at Cloncurry, who writes me:—"Climacteris melanura is found mostly in timbered country about Cloncurry, and in stony country towards the ranges, but is not seen in districts far east of the township."

I have never seen a specimen procured in New South Wales, although Dr. Ramsay in his "Tabular List of Australian Birds," records this State in its habitat. I have also described eggs of this species taken by Mr. James Ramsay at Tyndarie, on the 10th September, 1880. Dr. Ramsay has suggested that the birds were probably driven south during a period of drought and remained to breed. A parallel instance is afforded by *Eutamophila picta*, previously regarded as a strictly inland species, but which has been found breeding at Five Dock near Sydney, and within a few miles of the coast.

The eggs taken by Mr. James Ramsay at Tyndarie are two in number, of a light reddish-ground colour, which is almost obscured by heavy longitudinal blotches of rich reddish-brown, and a few nearly obsolete spots of lilac. Length (A) 0.9 × 0.79 inches; (B) 0.89 × 0.73 inches. Two eggs in Dr. W. Macgillivray's collection, taken in the Cloncurry District, Northern Queensland, are ovoid in form, the shell being close-grained, smooth and lustrous. They are of a faint reddish-white ground colour, which is almost obscured, particularly on one specimen, with numerous freckles, irregular-shaped spots and blotches of varied shades of reddish-brown and purplish-red, intermingled with similar formed but fewer underlying markings of violet-grey, all predominating as usual towards the thicker end, where is indicated on the heavily-marked specimen an ill-defined zone. Length (A) 0.98 × 0.72 inches; (B) 0.96 × 0.72 inches.

Immature males are brownish-black above and below, with narrow white streaks to the feathers on the throat; fore neck and centre of the upper breast ferruginous-brown; under tail-coverts blackish-brown with subterminal spots of white. Wing 3.3 inches.

Climacteris rufa.

RUFIOUS TREE-CREEPER.

Climacteris rufa, Gould, Proc. Zool. Soc., 1840, p. 149; *id.*, Bds. Austr., fol., Vol. IV., pl. 94 (1848); *id.*, Handbk., Bds. Austr., Vol. I., p. 600 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 335 (1883); Sharpe, Handl. Bds., Vol. IV., p. 357 (1903).

ADULT MALE—*General colour above dark ashy-brown, tinged with rufous on the ramp; upper wing-coverts and innermost secondaries like the back, the greater series dusky-brown, remainder of quills dusky-brown, paler brown towards the tips and crossed in the centre with a broad rufous band except on the three outermost primaries: tail-feathers pale rufous-brown, crossed with a broad subterminal band of blackish-brown, the central pair slightly darker and having near the shaft the remains only of the dark subterminal cross-bar: crown of the head dusky-brown; superciliary stripe rich rufous-brown; lores cheeks and ear-coverts rusty-brown, becoming slightly paler on the throat: an indistinct band on the fore neck dull ashy-brown some of the central feathers with a longitudinal stripe of dull white down the centre, bordered on either side with a narrow black line: remainder of the under surface rusty-red, some of the feathers with narrow white shaft streaks: centre of the breast and abdomen rusty-brown; under tail-coverts dull rusty-brown, some of the longer feathers margined at the tips and centred with dull white also showing traces, more or less distinct, of blackish-brown cross-bars: "bill black: legs and feet black; iris brown"*—(Morgan). *Total length 6·3 inches, wing 3½, tail 2½, bill 0·68, tarsus 1.*

ADULT FEMALE—*Differs from the male in having the longitudinal dull white stripe to the feathers on the centre of the fore neck bordered with rusty-red instead of black.*

Distribution—Western Australia, South Australia.

THE Rufous Tree-Creeper is an inhabitant of Western Australia, and the south-western portion of South Australia. There are specimens in the Australian Museum collection obtained by Mr. George Masters at Mongup, Salt River, Western Australia, in January, 1869, and a skin received from Mr. K. Broadbent, procured west of Nonning, South Australia. The late Mr. F. W. Andrews obtained this species in the Gawler Ranges, and I have received for examination from the South Australian Museum, Adelaide, a female procured at Donnell's Plain by Dr. A. M. Morgan and Dr. A. Chenery, relative to which the former has sent the following note:—"During our trip from Port Augusta to the Gawler Ranges in August 1902, *Climacteris rufa* was not seen until past Yardea, where it was fairly numerous, but never more than a pair were seen together. In a strip of big mallee they were seen leaving holes in trees, but no nests were found."

From South-western Australia Mr. Tom Carter writes me:—"Climacteris rufa is one of the commonest birds about Broome Hill where the timber is mostly White Gum (*Eucalyptus redunca*). They are of a confiding nature, and soon after the building of my house a pair of these birds would frequent the verandah to pick up bread crumbs at the very feet of anyone who choose to feed them."

The wing-measurement of adult males varies from 3½ to 3⅞ inches, and of adult females from 3½ to 3·6 inches.

In his "Handbook to the Birds of Australia,"³ Gould quotes the following notes of Gilbert's:—"Climacteris rufa is a common bird at Swan River, Western Australia, and is most abundant in the gum forests abounding with white ant. It ascends the smooth bark of the *Eucalypti*, and traverses round the larger branches with the greatest facility, feeding like the other members of the genus, upon insects of various kinds, but is frequently to be seen on the ground, searching for ants and their larvæ, and in this situation presents a most grotesque appearance from its waddling gait. It makes a very warm nest of soft grasses, the down of flowers, and feathers, in

³ Gould, Handbk. Bds. Austr., Vol. I., p. 600, (1865)

the hollow part of a dead branch, generally so far down that it is almost impossible to reach it, and it is therefore very difficult to find. I discovered one by seeing the old birds beating away a Wattle-bird that tried to perch near their hole. The nest in this instance was fortunately within arm's length, it contained three eggs of a pale salmon-colour thickly blotched all over with reddish-brown, eleven lines long by eight and a half lines broad, this occurred during the first week in October."

Climacteris erythrops.

RED-EYEBROWED TREE-CREEPER.

Climacteris erythrops, Gould, Proc. Zool. Soc., 1840, p. 148; *id.*, Bds. Austr., fol., Vol. IV., pl. 95 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 602 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 338 (1883); Sharpe, Hand-l. Bds., Vol. IV., p. 357 (1903).

ADULT MALE—*Forehead, crown of the head, centre of the nape and hind neck blackish-brown, the feathers on the forehead and sinciput with dusky-grey margins; mantle and upper back earth-brown; lower back, rump and upper tail-coverts dark grey; upper wing-coverts like the back, the outermost feathers of the greater series blackish-brown except at the tips; primary-coverts blackish-brown; quills brown at the base all but the three outermost primaries and the two innermost secondaries crossed in the centre with a band of pale greyish-buff, succeeded by a subterminal band of blackish-brown; the innermost secondaries washed with grey; two central tail feathers dark grey, the remainder dark grey paler at the tips and crossed with a broad subterminal band of blackish-brown, increasing in width towards the outermost feather, which is entirely blackish-brown except at the tip; lores, a broad superciliary stripe, and the feathers below the eye rusty-red; sides of the neck dark grey; chin and throat dull white, passing into light greyish-brown on the fore neck; remainder of the under surface greyish-brown, the apical portion of each feather having a broad dull white stripe down the centre bordered on either side with a narrow line of black; centre of the abdomen buff, each feather indistinctly streaked with white and having the remains of the black lines, forming spots or broken cross-bars; under tail-coverts buffy-white with blackish brown cross-bars broken in the centre by a narrow shaft line; bill black; legs and feet brownish-black; iris brown. Total length 6 inches, wing 3.4, tail 2.6, bill 0.68, tarsus 0.8.*

ADULT FEMALE—*Differs from the male in having the lores, superciliary stripe and feathers below the eye richer in colour, and the feathers on the fore neck rusty-red with a broad stripe of dull white down the centre.*

Distribution—New South Wales and Victoria.

SO far as I can learn, from the specimens in the Australian Museum collection, and Macleay Museum collection at the University of Sydney, the habitat of the Red-eyebrowed Tree-creeper is the most restricted of the genus. New South Wales is undoubtedly its stronghold, its range extending south to Victoria, and probably to the adjoining eastern portions of South Australia, but I have never seen a specimen from the latter State. Under the name of *Climacteris erythrops* specimens have reached me for examination from Northern and Southern Queensland, South Australia, and Western Australia, but in every instance they proved to be *Climacteris superciliosa*: a closely allied species. I have not the slightest doubt too the birds referred to by Mr. Keartland, obtained by the Calvert Exploring Expedition near Cue, in Western Australia, were females of *C. superciliosa*. A specimen of *C. erythrops* from any part of Queensland has never come under my notice, but a skin received in exchange from the Queensland Museum under that name and obtained by Mr. Kendal Broadbent, at Charleville on the Warrego River in South-western Queensland, is a female of *C. superciliosa*. Although these two species are quite distinct,

one might easily mistake the female of *C. superciliosa* for that of *C. erythrops*, especially as the distinguishing white supercilary stripe of *C. superciliosa* is bordered above by a narrower one of rusty-red.

In New South Wales the western portion of the State is the stronghold of the present species. It also occurs on the Blue Mountains, specimens in the Australian Museum having been obtained by Mr. R. Grant, at Lithgow, who informs me that it is by no means uncommon in the *Eucalypti* growing on the sides of valleys in that district, and where he has found it breeding. It is seldom, if ever, met with now near the coast, probably owing to the altered character of the country, but there are specimens in the Australian Museum collection obtained by Dr. E. P. Ramsay at Dobroyde, in March 1865, and by Mr. J. A. Thorpe, at Wollongong, in 1877. The latter has however, obtained it more abundantly at Tarana, one hundred and nineteen miles inland.



RED-EYEBROWED TREE CREEPER.

The late Mr. K. H. Bennett wrote of this species from the Mossiel District, New South Wales:—" *Climacteris erythrops* is confined to the forests of *Casuarina*, *Myoporum*, etc., up the rough trunks of which it runs with surprising celerity. Although in close proximity it is rarely if ever found in the clumps of *Eucalyptus* affected by the Brown Tree-creeper. It is much more arboreal in habits too than that species, but does occasionally resort to the ground for the purpose of capturing insects. It breeds during the months of October and November, and the site chosen is always the hollow trunk of a small tree, just large enough to contain the birds, at the bottom of which a nest is formed of a mass of vegetable fibre covered over with a layer of fur on which the eggs—never more than two are deposited."

A set of two taken by Mr. K. H. Bennett on the 10th November, 1886, at Ivanhoe, New South Wales, are oval in form, the shell being close-grained, smooth, and lustrous.

They are of a faint reddish-white ground colour, thickly freckled all over with light purplish-red, the markings predominating on the thicker end of one specimen, where intermingled with similar underlying spots of pale violet-grey they form a small but well defined zone. Length (A) 0·81 × 0·62 inches; (B) 0·85 × 0·65 inches. A single egg taken by Mr. Bennett at Ivanhoe, on the 9th September, 1885, is of a salmon-white ground colour with narrow fleecy longitudinal streaks of salmon-red uniformly distributed over the shell. Length 0·86 × 0·62 inches.

September and the three following months constitutes the usual breeding season of this species.

Immature birds of both sexes resemble the adults but are destitute of the rusty-red lores, supercilary stripe and orbital region, these parts being dusky greyish-brown, the chin and centre of the upper throat are dull buffy-white, remainder of the under surface uniform light earth-brown, except the centre of the abdomen which is buffy-white; under tail-coverts buff with imperfect V-shaped blackish-brown cross-bars. The wing-measurement is the same as the average adult, and fully plumaged birds, 3·4 inches. Two specimens in the Reference Collection, showing a slightly more advanced stage towards maturity, have a faint indication of the rusty-red supercilary stripe, and each have four feathers on the breast with a broad white streak down the centre bordered on either side with a narrow black line.

Climacteris superciliosa.

WHITE-EYEBROWED TREE-CREEPER.

Climacteris superciliosa, North, Ibis, 1895, p. 341; North and Keartl, Rep. Horn Sci. Exped. Cent. Austr. Pt. II., Zool., p. 96, pl. 7 lower fig. (1896); Sharpe, Hand-l., Bds., Vol. IV., p. 357 (1903).

ADULT MALE—*General colour above dull umber-brown; upper tail-coverts faint greyish-brown; upper wing-coverts and innermost secondaries slightly duller in colour than the back; primary-coverts brown, blackish-brown towards the tips; quills brown with blackish-brown bases, all but the three outermost primaries and the three innermost secondaries crossed in the centre with a broad band of rich buff, succeeded by a subterminal band of blackish-brown; tail feathers brown, crossed with a broad subterminal band of blackish-brown, except the central pair which has only an indistinct spot of blackish-brown near the shaft; forehead dark greyish-brown becoming slightly brighter on the crown of the head; lores black; a broad stripe commencing at the nostril and extending in a less perfect line above and behind the eye white; feathers below the eye and the ear-coverts greyish-black, streaked down the centre with white; chin whitish; throat and fore neck light greyish-brown; breast greyish-brown, the apical half of each feather with a broad pure white stripe down the centre bordered on either side with a line of black; abdomen and sides of the body buffy-brown, similarly but not quite so conspicuously streaked as the breast; under tail-coverts buffy white, with irregular blackish-brown crossbars; axillaries and greater under wing-coverts delicate buff, the lesser coverts white mottled with blackish-brown; bill black; legs and feet black; iris dark brown. Total length 5·7 inches, wing 3·5, tail 2·45, bill 0·5, tarsus 0·73.*

ADULT FEMALE—*Resembles the male in colour but having the upper tail-coverts dark grey and the tail feathers distinctly washed with grey; the white superciliary stripe is bordered above by a narrower line of rusty-red, and the feathers on the centre and lower part of the fore neck are dull white, margined on either side with pale rusty-red.*

Distribution.—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia.

ALTHOUGH the White-eyebrowed Tree-creeper was the last discovered species of the genus, subsequent research has proved it is also one of the most widely distributed, its range, except in the coastal districts, extending from the eastern to the western sides of the continent. The late Mr. K. H. Bennett obtained a male and female of this species on Moolah Station, New South Wales, in July 1883, and the Reference Collection also contains a female procured in South-western Queensland. During the journey of the Horn Scientific Expedition in Central Australia in 1894, Mr. G. A. Keartland obtained two males, one at Illara Creek, and the other at Bagot's Creek. Dr. A. Cheney presented an adult male to the Australian Museum obtained at Yudnapinna Station, forty-six miles from Port Augusta. From the Trustees of the South Australian Museum, I have also received on loan, specimens procured by Dr. A. M. Morgan and Dr. A. Cheney during a trip to the Gawler Ranges, in August 1902. Relative to these specimens Dr. Morgan writes me:—"Climacteris superciliosa was seen from Nonning to Yardea, where in the latter locality they give place to *C. rufa*. They are fairly numerous, but never more than a pair were obtained together. We did not see them in gum trees but seem to confine themselves to the myall." I have also examined a pair obtained by Mr. Edwin Ashby at Callion, Western Australia, and one from North-western Victoria. Mr. Keartland also obtained specimens near Lake Augusta, Western Australia, but they were abandoned with the rest of the collection at Johanna Springs.

The late Mr. K. H. Bennett refers as follows to this species:—"This Tree-creeper is met with throughout the timbered country, on Moolah Station, New South Wales, but is nowhere

plentiful. It builds in September, forming its nest in the hollow trunk of some small tree. The nest is simply the bottom of the hollow lined with feathers and other soft material."

Probably referable to this species were two nests found by Dr. A. M. Morgan and Dr. A. Chenery, during a trip made to Mount Gunson, one hundred and forty miles west of Port Augusta. Dr. Morgan writes:—"One found on the 4th August, 1900, at Oakden Hills, placed in the butt of a hollow myall, was composed entirely of rabbit fur without any attempt at arrangement, and contained a single fresh egg. The other at Mount Gunson on the 12th August, containing a single egg incubating. The nest was almost exactly in a similar situation and was of the same material. In colour the eggs closely resemble those of *Climacteris scandens*, Gould (*nee* Temm.). This Tree-creeper is smaller than the latter species, and I did not bear it utter a note at all. We met with it also at Mount Gunson, but were unable to procure a specimen."

Mr. Keartland writes me:—"Near Lake Augusta, Western Australia, in September, 1896, I had the good fortune to see two White-eyebrowed Tree-creepers going in and out of a hollow branch. Both were shot, and on splitting the branch open their nest was found nearly ready for eggs."

Mr. W. D. Campbell, sent from Menzies, Western Australia, two eggs of this species to the Trustees of the Australian Museum, and wrote:—"The nest was in the hollow branch of a small gum tree about six feet from the ground. The hollow was filled up for fifteen inches, and may have been an accumulation of successive nests. The bird had availed itself of all kinds of nesting material of which a thick mattress of sheep's wool and camel-hair formed a considerable portion. There was a brood of two nearly fledged young, and the accompanying two eggs, which were addled." The eggs are rounded ovals in form, the shell being close-grained smooth, and slightly lustrous. They are of a reddish-white ground, thickly freckled and spotted all over with rich reddish and purplish-brown, the markings being more numerous and are confluent on the larger end, where in one specimen they form a small but well defined zone. Length (A) 0.72 × 0.65 inches; (B) 0.73 × 0.65 inches. An egg received by Mr. Keartland, taken by Mr. C. E. Cowle, in Central Australia in March 1895, measures:—0.73 × 0.67 inches. The eggs of *Climacteris superciliosa*, are indistinguishable from those of small examples of *C. picummus*, Temminck.

Family SITTIDÆ.

Genus NEOSITTA, *Hellmayr*.

Neositta chrysoptera.

ORANGE-WINGED BARK-PECKER.

Sitta chrysoptera, Lath, Ind. Orn. Suppl. p. xxxii. (1801).

Sittella chrysoptera, Gould, Bds. Aust. fol. Vol. IV., pl. 101 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 609 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 360 (1883).

Neositta chrysoptera, Sharpe, Handl. Bds., Vol. IV., p. 351 (1903).

ADULT MALE—*General colour above dusky greyish-brown most of the feathers of the mantle, scapulars and back with conspicuous blackish-brown centres; rump white; upper tail-coverts white with a slight rufous wash on the basal portion which has a dark brown streak along the shaft and widening out into a cross bar towards the extremity of the feather; upper wing-coverts dark brown; quills dark brown crossed in the centre with a broad rich rufous band except a narrow edge on the outer web, this band decreasing in extent towards the innermost secondaries which are narrowly edged with whitish brown as are also the tips of most of the quills; tail feathers blackish-brown, the central pair*

narrowly edged with white at the tips, the remainder tipped with white, more largely towards the outermost feathers: forehead, crown of the head and nape dusky-brown, the ear-coverts slightly darker; chin, cheeks and upper throat white, passing into a dull white on the remainder of the under surface some of the feathers, particularly on the sides of the breast, indistinctly streaked with brown down the centre, the flanks slightly tinged with brown: under tail-coverts white, brown along the basal portion of the shaft, and widening out into a broad blackish-brown subterminal cross-bar; bill brown, yellowish at the base: legs and feet yellow; iris very pale creamy-buff. Total length in the flesh 4.5 inches, wing 3.1, tail 1.6, bill 0.5, tarsus 0.65.

ADULT FEMALE—Similar in plumage, but having the feathers on the head, and particularly the lores, orbital region and ear-coverts, darker than in the male.

Distribution—Queensland, New South Wales, Victoria, South Australia.

IT has been found that Swainson's well known name of *Sittella* for this genus of birds was preoccupied; in its stead therefore, Herr C. E. Hellmayr has substituted the generic name of *Neositta*.

The range of the present species extends from Southern Queensland, throughout the greater portion of New South Wales into Victoria, and some parts of South Australia. Nowhere is it more common than in the neighbourhood of Sydney where it is locally known as the "Diamond" or "Little Woodpecker." Open forest lands studded with the larger kinds of *Eucalypti* and *Angophora* are its favourite haunts, but at Ashfield and Canterbury I have found it breeding in isolated trees close to the principal streets. It is a resident species, and is usually met with during the autumn and winter months in small flocks numbering from five to eight, or more individuals. It is an interesting sight to watch these industrious little birds running up or down the trunks, or along the limbs of trees, stopping for a few moments to peer into any crevice in which an insect may lurk, or valiantly tugging at a loosened piece of bark to secure the larvæ of some wood frequenting insect; if one remains quiet this they will often do, when an onlooker is only a few feet away. While engaged in their search a short "chip chip" is uttered also while passing from tree to tree when it is generally alternated with a succession of hurried warbling notes. The rufous band through the quills which shows more conspicuously during flight and the slender, finely pointed and slightly recurved bill will enable one to recognise this useful and active little bird. The wing measurement of adult males varies from 3 to 3.2 inches.

The nest is usually a beautiful inverted cone-shaped structure with a cup-like cavity at the top, the rim being sharp and thin. It is composed of thin scales and shreds of bark, and less frequently with the downy tufts of *Banksia* cones, held together with cobwebs, and ornamented with small pieces of bark fastened longitudinally on the outside with cobwebs, giving it a shingled appearance, and closely resembling the branch on which it is built, rendering it difficult of detection; inside it is neatly lined with bits of pale green lichen, and this material is sometimes used as an outer decoration. As a rule the nest is built at the junction of an upright forked branch, sometimes against a slightly leaning single stemmed branch, frequently a long dead one, and well out of the way of bird-nesting boys. The length of the nest varies considerably according to the angle of the fork, in or against which, it is built. In a number of nests now before me, those built in wide angled forks average externally two inches and three-quarters in height, and those against acute angled forks four inches and a half. In external diameter they all average two inches in diameter, at the rim, some nests being slightly broader in the centre, and the cup-like cavity measures nearly one inch and three-quarters in diameter by one inch and a half in depth. *Eucalyptus* and *Angophora* are the trees most often resorted to as nesting sites, also *Casuarinas* and *Acacias*, the nests varying in height from fifteen to sixty feet from the ground.

The eggs are usually three, rarely four, in number for a sitting, oval or rounded oval in form, the shell being close-grained, smooth, and lustreless. When fresh, and just after being

blown, the ground colour is a beautiful bluish or greenish-grey, which usually fades to a bluish or dull white after some time. Some specimens are minutely but thickly freckled all over with slaty-grey and slaty-black, intermingled with much fainter subsurface markings of similar hues, but more often are they found boldly blotched and spotted with slaty-black and inky-grey particularly around the centre or the larger end, where in many instances the markings are confluent and form a more or less well defined zone. Occasionally specimens are found with a band or wreath formed of large irregular-shaped inky-grey blotches on the thicker end, the remainder of the shell having a few minute freckles of the same colour, or entirely devoid of markings. A set of three taken at Ashfield, New South Wales, measures: Length (A) 0.72 × 0.52 inches; (B) 0.72 × 0.52 inches; (C) 0.7 × 0.51 inches. A set of three taken at Belmore, on the 4th October, 1896, measures:—Length (A) 0.68 × 0.57 inches; (B) 0.68 × 0.56 inches; (C) 0.67 × 0.58 inches. A set taken at Roseville, on the 18th September, 1904, measures:—Length (A) 0.67 × 0.5 inches; (B) 0.65 × 0.5 inches; (C) 0.65 × 0.5 inches.



NEST OF ORANGE-WINGED BARK-PECKER.

The nest figured was built at a height of thirty feet, on a dead forked leaning branch of a Rough-barked Apple-tree (*Angophora intermedia*) growing in the playground of the Willoughby Public School. I found it on the 3rd September, 1899, by seeing the birds carry nesting material to it, and twelve days later, when it was taken, the female was sitting on two fresh eggs. This nest, a typical one, is now in the Group Collection of the Australian Museum.

In the neighbourhood of Sydney, nidification usually commences about the third week in August, although I have taken a nest with eggs at Canterbury, as early as the 27th of August. The birds two days afterwards removed this nest piece by piece and

constructed it in a more secure position in an adjoining tree. As I have pointed out,* several birds may assist in the construction of a nest; in one instance it was a male and two females. The first occasion I saw this was on the 10th September, 1893, at Ashfield, when three birds were engaged in building a nest in an upright dead fork of a Eucalyptus close to my house, and where from a window they were under daily observation. This nest was finished eight days later, for from that time one of the birds commenced to sit, occasionally being relieved by another, whether by two it was impossible to tell, although three birds attended to the wants of apparently three young, from the number of bills visible over the sides of the nest when nearly fledged, which they vacated in October. Early in September of the following year a pair of birds constructed half a nest on the branch a few feet away from the old one, but eventually removed it to the next

* Handbk. Austr. Assoc. Adv. Sci., Sydney, p. 83, 1893.

tree, where the nest was completed and a bird sitting by the 15th September. At Roseville, only once have I seen three birds assisting in the construction of a nest, and that was on the 28th October, 1898. This nest was fully sixty feet from the ground, and the same structure or nesting-site was occupied in September of the following year. On the 1st September, 1896, at Ashfield, I found two nests nearly completed, built in trees close to main streets, and on the 21st September found two more with the birds sitting, and several nests were taken with full sets of eggs during that month at Canterbury. A nest found at Roseville I had my attention attracted to it by the sitting bird uttering a short "chip, chip," and which it continued for some time until relieved by another bird. If robbed of their eggs they frequently construct a nest in a tree near at hand. I have a set of three taken at Roseville, on the 18th September, 1904, belonging to a pair of birds whose previous nest in a tree twenty yards away was robbed of an egg on the 30th August. I have found many nests being built in August, a lesser number about the middle of October, and one at Narrabri as late as November. The breeding season continues until the end of December, during which time evidently two broods are reared.

Young birds have the feathers of the head, mantle, and back tipped with a dull white sagittate marking, giving the upper parts a distinctly mottled appearance; the greater upper wing-coverts, and the innermost secondaries have a light rufous wash, the former being tipped, and the latter margined with dull whity-brown, as are also the tips of the primaries; the white tips of the lateral tail feathers have an ochreous rufous wash, and the under parts are white with only a faint indication of brown shaft lines on the sides of the breast. Wing 3 inches.

Gould, who described *Sittella tenuirostris* in his "Handbook to the Birds of Australia,"* from a specimen obtained by Captain C. Sturt, the locality in which it was obtained being unknown, refers it to a long-billed form of *S. chrysoptera*; while Dr. Gadow in the "Catalogue of Birds in the British Museum,"† states that Gould's type is an immature male, and regards it as a subspecies of *Sittella pileata*.

Neositta pileata.

BLACK-CAPPED BARK-PECKER.

Sittella pileata, Gould, Proc. Zool. Soc., 1837, p. 151; *id.*, Bds. Austr., fol., Vol. IV., pl. 104 (1848); *id.* Handbk. Bds. Austr., Vol. I., p. 612 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 362, (1883).

Neositta pileata, Sharpe, Hand-l. Bds., Vol. IV., p. 352 (1903).

ADULT MALE—General colour above greyish-brown, some of the feathers on the back having slightly darker brown centres; rump white; upper tail-coverts white washed with rufous, except towards the tip, where there is a narrow black cross-bar, or wedge-shaped marking; upper wing-coverts and quills blackish-brown, the latter edged with whity-brown at the tips, and crossed in the centre with a broad rich rufous band except a narrow edge on the outer web, this band decreasing in extent towards the innermost secondaries which are brown with a dusky wash near the shaft; tail feathers brownish black, the central feathers slightly and the outer ones largely tipped with white; crown of the head and centre of the nape black; forehead, lores and orbital region white; ear-coverts pale greyish-brown; cheeks, throat and all the under surface pure white; flanks greyish-brown; thighs blackish-brown; under tail-coverts white with a slight brownish wash on the basal portion and an arrow-headed blackish-brown marking towards the tip; bill blackish-brown, yellow at the base; legs and feet yellow. Total length 4.75 inches, wing 3.4, tail 1.7, bill 0.58, tarsus 0.7.

* Gould, Handbk. Bds. Austr., Vol. I., p. 610, (1865).

† Cat. Bds. Brit. Mus., Vol. VIII., p. 363 (1883).

ADULT FEMALE—*Differs in plumage from the male, in having the forehead, lores, orbital region, nape and ear-coverts black like the crown of the head.*

Distribution—South-western New South Wales, Victoria, South Australia, Central Australia, Western and North-Western Australia.



BLACK-CAPPED BARK-PECKER.

IN favourable situations the range of the present species extends over the southern half of the Australian continent. It occurs throughout South-western New South Wales, Western Victoria, the greater portion of South and Central Australia, and Western Australia as far north as Point Cloates. There are numerous specimens in the Australian Museum collection, obtained principally by Mr. K. Broadbent, near Port Augusta, and Mr. George Masters at Port Lincoln, South Australia, the latter of whom also secured examples at King George's Sound in Western Australia in 1867. The late Mr. K. H. Bennett also forwarded specimens from the Mossgiel District, New South Wales. Although bearing a general resemblance to each other,

there is a marked difference in the colour of the head of the two sexes, as will be seen in the preceding descriptions. The wing measurement of adult males varies from 3·3 to 3·55 inches. The accompanying figure represents an adult female.

Dr. A. M. Morgan writes me:—"During a trip made in company with Dr. A. Chenery, from Port Augusta to the Mount Gunson District, South Australia, in August 1900, *Sittella pileata* was frequently met with, but only in myall and mulga scrubs. Two nests were found, one on the 1st August, at The Birthday, ninety-five miles north-west from Port Augusta; only two birds were seen at this nest which was just finished. The other was on the 12th August, containing one fresh egg. Five birds were seen at this nest, and both were built in myalls. In August 1902, we found it common in all timbered situations, in small flocks from six to eight in number, during a trip made from Port Augusta to the Gawler Ranges."

Mr. T. A. Keartland writes me: "Both in Central and Western Australia I frequently saw *Sittella pileata* in flocks from six to twelve in number. They always appeared to be in a hurry and ravenously hungry, running up and down all kinds of small trees, but preferring those with rough bark, in the crevices of which they searched for food."

Mr. C. G. Gibson informs me that at Tuckanarra, Western Australia he found a nest of *Neositta pileata* on the 16th October, built in a mulga, containing three young, and another on the following day with three much incubated eggs.

Writing from the Mossgiel District, New South Wales in 1886, the late Mr. K. H. Bennett remarks: "*Sittella pileata* is by no means numerous, and is generally met with in small troops of six to eight individuals. It chiefly inhabits the timbered back country, but it is occasionally met with in the clumps of trees out on the plains."

From Point Cloates, North-western Australia, Mr. T. Carter writes:—"I have seen *Sittella pileata* at times in belts of a species of mallee that grows inland from here, but never succeeded in finding its eggs. I shot a fledged young one in company with the adults on 25th July, 1900."

Mr. Keartland records meeting with flocks of this species at Lake Augusta, Western Australia, and later on at the Fitzroy River in North-western Australia. The latter birds are

* Trans. Roy. Soc., S.A., Vol. XXII., p. 183 (1898).

most likely referable to *Neositta leucoptera*, of which there are specimens in the Australian Museum collection, procured by the late Mr. T. H. Bowyer-Bower in the same locality.

The nest is precisely similar to that of *N. chrysoptera*, and is of a deep cup or an inverted cone-shape with a cup like cavity at the top. It is formed of shreds of bark fitted together on the outside with fine strips of bark held together with cobwebs, and is usually built at the junction of a two or more pronged upright or nearly upright fork. Photographs forwarded to me by Dr. A. M. Morgan of nests taken by him at Mount Gunson and Athelstone, South Australia, closely resemble that of *N. chrysoptera* figured on the preceding page. The nest taken by Dr. Morgan on the 19th August, 1900, at Athelstone, about seven miles from Adelaide, was built in a Eucalyptus about twenty-seven feet from the ground and contained three slightly incubated eggs. This nest which I saw in the South Australian Museum, Adelaide, measures greatest depth three inches and a half on one side of the fork, three inches on the other, external diameter two inches and a quarter, the inner cup two inches in diameter by one inch and a third in depth.

The eggs are three in number for a sitting, rounded oval in form, the shell being close grained smooth and lustreless. The same variation exists in the colour and disposition of the markings as in *Neositta chrysoptera*, but in the sets I have examined, typically the eggs of *N. pileata* appear to be more heavily blotched than are the eggs of that species. They vary from a bluish-grey to a pale bluish-white ground colour, which is freckled, spotted, or heavily blotched with slaty-black in some specimens, and slaty-grey, clouded underlying patches of the latter colour appearing as if beneath the surface of the shell. A set of two in the collection of the South Australian Museum, Adelaide, are of dull white ground colour, with a broad band of blackish-grey blotches around the larger end. A set of three taken in the Wimmera District, Victoria, measures:—Length (A) 0.68 × 0.51 inches; (B) 0.66 × 0.5 inches; (C) 0.67 × 0.54 inches. Another set of three taken in Western Australia, measures:—Length (A) 0.7 × 0.48 inches; (B) 0.69 × 0.32 inches; (C) 0.68 × 0.53 inches.

The young male resembles the adult, but has a narrow sagittate whitish-brown marking on the apical portion of the feathers on the crown of the head, nape, mantle and back, giving these parts a distinctly streaked appearance, the upper wing-coverts have a rufous spot at the tip, the secondaries being similarly marked with brownish-white, and the primaries are narrowly edged with brownish-white at the tip. Wing 3.2 inches.

Neositta leucocephala.

WHITE-HEADED BARK-PECKER.

Sittella leucocephala, Gould, Proc. Zool. Soc., 1837, p. 152; *id.*, Bds. Austr., fol., Vol. IV., pl. 102 (1848); *id.*, Handbk., Bds. Austr., Vol. I., p. 610 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. VIII., p. 361 (1883).

Neositta leucocephala, Sharpe, Hand-l. Bds., Vol. IV., p. 352 (1903).

ADULT MALE—*General colour above greyish-brown, passing into a slightly clearer brown on the lower back, which has darker brown centres to most of the feathers, as have also the scapulars; rump and upper tail-coverts white, the latter with a dark brown streak down the centre and widening out into a crossbar towards the extremity of each feather; upper wing-coverts dark brown; quills dark brown crossed in the centre with a broad rufous band except a narrow edge on the outer web, this band decreasing in extent towards the innermost secondaries which are edged with greyish-brown; tail feathers blackish-brown, the central pair narrowly edged with white at the tips, the remainder tipped with white, more largely on the outermost feathers; head and neck pure white; chest, breast, and abdomen greyish-white, with a brownish streak down the centre of each feather; under tail-coverts white*

with a blackish-brown streak down the centre widening out into a triangular shaped patch towards the extremity of each feather; bill black; legs and feet yellow; iris pale yellow. Total length 4.25 inches, wing 3.05, tail 1.5, bill 0.48, tarsus 0.6.

ADULT FEMALE - Similar in plumage to the male.

Distribution - Queensland.

THIS species is probably confined to Queensland, although it may possibly occur in the contiguous north-eastern portions of South Australia. It has also been erroneously recorded from Northern New South Wales, but it does not occur in the latter State. There are specimens in the Australian Museum collection obtained at Wide Bay by Mr. George Masters, and at Chinchilla in Western Queensland by Mr. K. Broadbent, and six specimens procured by Mr. H. G. Barnard at the Dawson River, Queensland, from whom the nest and eggs have also been received. In the Macleay Museum there are specimens obtained at Port Denison. Gould's three figures of this species in the "Birds of Australia," are all different, to which he draws attention, stating that the bird with the pure white head procured by Gilbert may prove to be distinct. The upper figure has the head hoary-grey, similar to a specimen in the Australian Museum, the lower one on the left side of the plate has the top of the head overspread with a dusky wash, almost as dark as in *N. chrysoptera*. Of the latter type is the specimen obtained by Mr. K. Broadbent, and to which he also makes reference.* Of the six specimens received from Mr. Barnard, four have the head pure white, another has a slight hoary wash, the other a young bird has the head greyish-brown. In answer to an inquiry, Mr. Barnard informs me that when the head is not pure white in both sexes, it is an indication of youth or immaturity. The wing measurement of adults varies from 2.9 to 3.2 inches.

A nest in the Australian Museum collection is a cup-shaped structure, formed of fine short shreds and scales of bark, intermingled with cobwebs and plant-down, the inside being lined with pieces of the white egg-bags of spiders. It is built at the junction of an upright forked branch, the bottom of the structure tapering and somewhat resembling an inverted rounded cone, the whole exterior being covered with short pieces of bark fastened longitudinally with cobwebs, and giving it the usual shingled appearance of the nests of this genus. It measures externally three inches in length by two inches in diameter, the inside cup measuring one inch and three quarters in diameter, by one inch and a quarter in depth. It contained three fresh eggs, and was taken by Mr. H. G. Barnard at Bimbi, on the Dawson River, Queensland, on the 14th March, 1905, and the male was forwarded with it, shot some distance from the nest.

Mr. Barnard sent me the following note :--" During the big drought in 1902 birds of many species died here in hundreds, and several species, including *Malurus melanoccephalus* and *Centropus phasianus*, have since entirely disappeared. Last spring (1904), owing to the dry weather, no birds bred in this part, but on the 14th March, 1905, while out fencing I heard the note of *Sittella leucocephala*, and looking up saw three of the birds fly into a dead Bloodwood tree,† and from their actions I concluded they were nesting. On going over I saw the nest with a bird sitting on it, and climbing the tree found there were three eggs in it. I went home and returned with my gun. After waiting some time at the tree the male came and fed the female while sitting, and after flew some distance away. I managed to shoot him, and returning flushed the female, but unfortunately only managed to wound her. She flew into some thick bushes, and I could not find her." Writing in March, 1906, Mr. Barnard remarks :--" *Sittella leucocephala* is breeding again now, but I think this is owing to the dry spring we had last year. The usual breeding season is from June to October, preferably the winter months. These birds build many nests, and desert them when completed. I have lately found three nests, and the birds

* Proc. Roy. Soc. Queensl., Vol. II., p. 125 (1886).

† *Eucalyptus corymbosa*.

deserted all of them when they were completed. Of five nests I found last year, the only one the birds laid in was the one I sent you."

The eggs are three in number for a sitting, rounded oval in form, the shell being close-grained, smooth, and lustreless. They vary from a delicate bluish-white to a greenish-grey ground colour, which is minutely freckled and spotted with slaty-grey, slaty-black and sepia, with which are intermingled a few larger irregular-shaped darker blotches, and some fainter inky-grey underlying markings. In some specimens the markings are more numerous, and thickly disposed around the larger end, where they assume the form of an irregular zone. Two eggs received from the late Mr. George Barnard, and taken during 1883 at Coomooloolaroo, Duaringa, Queensland, measure—Length (A) $0\cdot63 \times 0\cdot51$ inches. Two eggs in the Australian Museum collection, taken in the same locality, measure alike, length $0\cdot63 \times 0\cdot62$ inches. A set of three taken on the 25th September, 1892, measures:—Length (A) $0\cdot61 \times 0\cdot49$ inches; (B) $0\cdot6 \times 0\cdot5$ inches; (C) $0\cdot61 \times 0\cdot51$ inches. There is nothing to distinguish the eggs of the different species of the genus *Neositta* from one another. All are alike in colour, and in the varying disposition of the character of their markings. The set taken by Mr. H. G. Barnard, on the 14th March, 1905, measures:—Length (A) $0\cdot63 \times 0\cdot5$ inches; (B) $0\cdot64 \times 0\cdot49$ inches; (C) $0\cdot62 \times 0\cdot5$ inches.

Immature birds of both sexes resemble the adults, but have the upper wing-coverts tipped with brown, and the quills are narrowly edged with greyish-brown at the tips; the feathers of the head, cheeks and chin are white with a greyish wash, and the throat and fore neck are dusky-grey; the remainder of the under surface is dusky greyish-white, and there is only a faint indication of the darker brown centres on a few of the feathers on the upper breast.

Family MELIPHAGIDÆ.

Genus MELIORNIS, Gray.

Meliornis novæ-hollandiæ.

NEW HOLLAND HONEY-EATER.

Certhia novæ-hollandiæ, Lath. Ind. Orn., Vol. I., p. 296 (1790).

Meliphaga novæ-hollandiæ, Gould, Bds. Austr., fol., Vol. IV., pl. 23 (1848).

Meliornis novæ-hollandiæ, Gould, Handbk. Bds. Austr., Vol. I., p. 486 (1865); Galow, Cat. Bds. Brit. Mus., Vol. IX., p. 253 (1884).

ADULT MALE.—General colour above blackish-brown, the feathers on the hind-neck margined with greyish-brown, and those on the upper back with white; lower back and rump brown, streaked with blackish-brown; upper wing-coverts and quills blackish-brown, the outer webs of the latter externally with golden-yellow, more broadly at the base, and forming a conspicuous patch when the wing is closed, the apical portion of the outer web of one, and sometimes two of the innermost secondaries, narrowly edged with white; tail-feathers blackish-brown, margined at the base of their outer webs with yellow, the lateral feathers with a white spot at the end of the inner web, and which increases in size towards the outermost on either side; crown and sides of the head and the ear-coverts black; tips of the feathers on the forehead, and a narrow line on each side of the nape, white; a tuft of feathers on the cheeks, and another behind the ear-coverts white; chin and centre of the upper throat black; feathers on the lower throat, which are long and hair-like, white with blackish-brown bases; remainder of the under surface pure white, conspicuously streaked with blackish-brown more broadly on the center of the chest; under tail-coverts white streaked with blackish-brown; thighs brown; bill

black; legs and feet black; iris white. Total length in the flesh, 7.25 inches, wing 3.1, tail 3.1, bill 0.78, tarsus 0.85.

ADULT FEMALE—*The sexes are alike in plumage.*

Distribution—Southern Queensland, New South Wales, Victoria, South Australia, Tasmania and some of the larger Islands of Bass Strait.

THIS familiar and attractive species is freely distributed throughout the greater portion of South-eastern Australia, and is also common in Tasmania. It is resident throughout the year, and evinces a decided preference for the low scrubby undergrowth of the coastal districts, where the *Banksia* and other nectar-bearing trees abound. Nowhere have I seen it so abundant as in the neighbourhood of Sydney, particularly at Long Bay, La Perouse, and around the shores of Botany Bay: also, about Middle Harbour, and from Manly on to Narrabeen. It is also met with in greatly decreased numbers in swampy parts of the Blue Mountains, but I have never seen it in the level country on the western side of the range. Lively in action its richly contrasted plumage is displayed to advantage, as it flits from shrub to shrub in search of insects, or to extract the nectar from some flower with its peculiarly brush-like tongue, so well adapted for the purpose. During the hot midsummer months of some years, it may be seen in large numbers feeding on insects in the large Fig-trees (*Ficus macrophylla*) in Hyde Park, and other public parks and gardens of Sydney. They are, however, irregular in their appearance. In January and February 1902, during a period of drought these birds were unusually numerous, but I have not seen them since, although the bush-fires were very prevalent in the neighbourhood of Sydney in January 1905, and were likely to affect their food supply. These birds may also occasionally be seen in the Botanic Gardens, Sydney, and I have seen them at Melbourne and Adelaide in similar public gardens and resorts. The first nest of this Honey-eater I ever found was in the Botanic Gardens, Melbourne, and in addition to a full complement of eggs, it also contained one of the Rufous-tailed Bronze Cuckoo (*Lamprococcyx basalis*).

The single note of this species is shrill and loud, but when disturbed by an intruder it is rapidly uttered several times, and generally when perched on some coign of vantage, as the top of some neighbouring bush, or clinging to the side of a grass-tree stem.

Stomachs of these birds I have examined contained only the remains of insects. Although the numerous members of this family are called Honey-eaters and feed largely on the nectar of flowers, insects as a rule form the staple article of the diet of most of them. A less number in addition to the nectar of flowers, show a preference for wild or cultivated fruits, while some species partake of all these diets.

The nest is an open cup-shaped structure, and generally rather roughly formed externally of strips of bark, thin plant stalks, and dried grasses matted up and held together with cob-webs and the silky egg-bags of spiders, the inside being neatly lined with finer plant stalks and at the bottom most frequently with a thick layer of the red downy tufts of *Banksia* cones; at other times with the woolly portions of the Flannel-flower, or small dead flowers, thistle-down when procurable or any soft and warm material. Some nests are more neatly made than others and assimilate in colour to their surroundings. When built in the upright fork of a *Melaleuca*, the nest is often constructed externally of strips of the paper-like bark of that tree, dark brown bark is often used when constructed in a *Banksia*, and spider's web and white egg-bags are largely used when built in the young and light green rigid spine-like leaves of an *Hakea*. The frame work of a nest I found in one of the latter shrubs at Canterbury in April 1894, was formed entirely of these materials. An average nest measures externally three inches in diameter, by two inches and a half in depth, the inner cup measuring two inches in diameter by one inch and a half in depth. In the neighbourhood of Sydney the nest is usually built in an upright pronged-fork of one of the above mentioned trees, sometimes in a mass of creepers, or stunted gum sapling,

or placed between *Banksia* cones. Some nests are well concealed, but as a rule they are the most easily found of any bird, in the locations this species frequents. One I found at Canterbury containing young, was placed on the top of a low bush and was entirely devoid of shelter or of an attempt at concealment of any kind. In parks and gardens any suitable shrub is selected.

The eggs are two or three in number for a sitting, varying from oval to elongate and thick oval in form, occasionally they are somewhat sharply pointed at the smaller end; the shell is close-grained, smooth and more or less lustrous. Typically the ground colour varies from a pale buff to a creamy-buff which is freckled and spotted with different shades of reddish-chestnut, or purplish-brown, the markings as a rule being larger and predominating on the thicker end where they not infrequently form a well defined zone. Some specimens have a cap only on the larger end, formed of confluent hair lines, short wavy streaks and ill-shapen figures; while others have a few scattered underlying spots and blotches of violet-grey. Occasionally sets may be found with the ground colour almost pure white, and markings of a rich purplish-red, or a reddish-black hue. A set of two taken at La Perouse, Botany Bay, on the 8th August 1892, measures:—Length (A) 0·83 × 0·66 inches; (B) 0·8 × 0·6 inches. A set of three taken at Canterbury, near Sydney, on the 22nd April, 1894, measures:—Length (A) 0·78 × 0·57 inches; (B) 0·79 × 0·6 inches; (C) 0·78 × 0·58 inches.

Nestlings are smoky-black above, the crown of the head having a lanceolate patch of black feathers in the centre and tufts of long dark brown down on the sides, the quills dark brown, narrowly margined with yellow on their outer webs; throat and flanks smoky-black the rest of the under surface dull white, the centre of the abdomen being devoid of feathers.

Young birds are brown above, some of the scapulars and feathers on the back having smoky black centres, wings and tail as in the adult; crown of the head smoky-black, the forehead slightly darker, the stripe on each side of the crown and nape dull white; lores, feathers around the eye and the ear-coverts dull black, tips of the feathers on the forehead, and the tuft of feathers on the cheek dull yellow; chin and throat dusky-brown, remainder of the under surface dull white washed with brown on the flanks, and broadly streaked on the upper breast with dull blackish-brown. Wing 2·7 inches.

These birds often select a certain belt of scrub and breed year after year within a few yards of each other, but a new nest is constructed for each successive brood. Usually the female slips away from the nest unobserved upon hearing the approach of an intruder, but not infrequently will remain sitting until one is quite close, trusting to escape observation by keeping perfectly still. When the nest contains young, although usually every symptom of parental solicitude is exhibited, on many occasions the old birds were induced to make their appearance only by my imitating the notes of a young bird in distress. I found the nests of this species near Melbourne, Victoria, also in the scrubby undergrowth on the shores of Port Phillip Bay, between Brighton and Frankston, but never in the numbers I have in New South Wales.

As pointed out in the Proceedings of the Linnean Society of New South Wales in 1894,* I had noted for four successive years in the neighbourhood of Sydney, that the New Holland Honey-eater has two distinct breeding seasons in the year, and probably elsewhere, rearing a brood in the clear, warm, genial days of April and May, and commencing to breed again from August and continuing until the end of December; nests with eggs or young are however more frequently found during August, September, and October. These are the normal breeding seasons, but nests with eggs or young may occasionally be found throughout the year. On the 15th February, 1903, at Freshwater, near Manly, Mr. A. F. B. Hull found a nest partly lined with fowls' feathers containing eggs, and another nest on the 1st March following, also with two fresh eggs.

* Proc. Linn. Soc. N. S. Wales, 2nd Series, Vol. X, p. 186 (1894).

At Canterbury and Botany during a week at the latter end of April, 1894, I found seventeen new nests of the New Holland Honey-eater, eleven of them containing eggs, or young ones a few days old, the remainder of the nests being in different stages of construction, and in addition saw fledgelings in the bush, that had just left the nest. These observations I have since verified during the succeeding twelve years. In the autumn and winter of 1906, unusually dry periods, the nests of this species, also of *Meliornis sericca*, were very common in the neighbourhood of Sydney.

Many young birds are destroyed by bush fires. On the 5th August, 1895, I went to Botany and found in a small patch of scrub two nests with eggs, two with young in the down, and one nest nearly finished. At the time men were engaged in setting fire to some cut scrub, a fierce wind sprang up and it extended to the adjoining bush, and when I left a large tract of country was in flames. Visiting it a fortnight later, the patch of scrub where the nests were, nothing remained but burnt and blackened stems, and without a bird to be seen.

I saw a beautiful albino of this species at Botany, several times. It was apparently being chased by several of its normal plumaged congeners. There is a partial albino specimen in the Australian Museum collection. It has the plumage dull white, the quills and tail feathers are margined with yellow, crown of the head and throat having a faint brownish wash; sides of the head brown.

When I first visited the classic collecting grounds of La Perouse, and the northern shores of Botany Bay, in September 1886, and for many years before being more or less cleared, they possessed an especial charm for me. To search for the nests of *Meliornis nove-hollandia* and *Glycyphila fulvifrons* in the bright clear days of early spring, was indeed a pleasure. The heathlands were then in flower, and the air laden with the perfume of Acacia, and at times with the slowly ascending incense from some half-burnt and still smouldering *Xanthorrhœa*, the remains of a grass-tree gum collector's camp fire. How closely are these places associated with the early history of settlement in Australia, and its zoology and botany. Looking across the blue wind-swept waters of Botany Bay one may see at Kurnell the stone column that marks the spot where Captain Cook first landed in 1770. Here too, Solander and Banks collected specimens of an entirely new and curious fauna and flora. Eighteen years afterwards Governor Phillip in command of the First Fleet landed on its shores, and for a long time after the removal of the colony to Sydney Cove they were often visited by Surgeon-General White in quest of specimens. Many of the Australian birds described by Dr. Latham in his "Index Ornithologicus," were obtained in these localities. Almost simultaneous with the arrival of Phillip at Botany, appeared the French frigates, the *Boussole* and the *Astrolabe*, at the entrance of the bay, under the command of the illustrious but ill-fated La Perouse. He remained for some time and was last heard of from the spot near North Botany Head that now bears his name. The body of Père le Receveur one of the naturalists of this expedition, who died on the 17th February, 1788, is buried here. Close by, the imposing cenotaph erected to the memory of La Perouse and his companions is a conspicuous feature in the landscape. On its base are attached brasses commemorating the visits at different times of the commanders and officers of several French warships. Of late years the scrub and heathlands between La Perouse and Botany have been much altered, and a cemetery formed, to which has been transferred the remains of John William Lewin, who published the first work on Australian birds. At Kurnell on the opposite shore of the bay, but little change has apparently taken place since the famous British navigator first landed at this spot, now the richest in historic interest and associations in Australia.

Meliornis longirostris.

LONG-BILLED HONEY-EATER.

Meliophaga longirostris, Gould, Proc. Zool. Soc., 1846, p. 83; *id.*, Bds. Austr., fol., Vol. IV., pl. 24 (1848).

Meliornis longirostris, Gould, Handbk. Bds. Austr., Vol. I., p. 488 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 254, (1884) *subsp.*

ADULT MALE—*Like the adult male of MELIORNIS NOVE-HOLLANDIÆ, Latham, but the white patch of feathers on the cheeks is much narrower, and typically it has a slightly longer bill. Total length (of skin) 6·7 inches, wing 3·1, tail 3·1, bill 0·88, tarsus 0·8.*

ADULT FEMALE—*The sexes are alike in plumage.*

Distribution—Western Australia.

FROM specimens now before me, collected by Mr. George Masters at King George's Sound, typically this western form may be distinguished by the characters pointed out by Gould, but Dr. Gadow remarks* "intermediate forms frequently occur in Southern Australia." Dr. Ramsay† has included Wide Bay, Queensland, and New South Wales, as well as Western Australia, in its habitat, but all the specimens I have examined from Eastern and Southern Australia vary from *M. longirostris* in having the broader tuft of white feathers on the cheeks. The most constant character in the specimens of *M. longirostris*, collected by Mr. Masters in Western Australia is the much narrower white patch of feathers on the cheeks, the length of the bill although typically longer, is variable, but the wing and tail-measurement is the same as that of average eastern examples. Mr. Masters, who obtained twenty-five specimens and several nests with eggs and young, informs me it is indistinguishable from *M. nove-hollandiæ*, in the situations it frequents, habits, and sites selected as nesting places.

A nest in the Australian Museum collection, taken by Mr. G. Masters, on the 1st October 1868, is an open cup-shaped structure, outwardly formed of fine strips of bark, fibrous roots and grasses, and is lined inside with the soft downy tufts of *Banksia* cones, it measures externally four inches in diameter by two inches and a quarter in depth, the inner cup measuring two inches and a quarter in diameter by one inch and a half in depth, the rim which is thick and rounded measuring one inch in width. This nest was built in a *Banksia* close to the ground.

Four nests received from Mr. C. G. Gibson and taken by him at Laverton, Western Australia, in July and August, 1905, are distinctly smaller and more neatly formed externally than are the nests of the eastern species. Grey is their prevailing colour, being formed principally of soft dead grey grasses, with which are intermingled stalks of herbaceous plants, cobwebs, and plant down, the inside being entirely lined with the latter material; they are attached at the sides to the thin terminal leafy stems of various shrubs, the one figured on the next page is built in a species of salt-bush. It measures externally two inches and a half in diameter by two inches and a half in depth, the inner cup measuring one inch and three-quarters in diameter by one inch and a half in depth.

Eggs two or three in number for a sitting, varying from narrow to thick oval in form, the shell being close-grained, smooth, and slightly lustrous. They are of a pale buff ground colour which is thickly freckled and spotted with chestnut and reddish-brown, the markings predominating as a rule around the thicker end, where in some instances they form a well defined zone. Others have the markings nearly obsolete and appearing as if beneath the surface of the shell.

* Cat. Bds. Brit. Mus., Vol. IX., p. 254 (1883).

† Tab. List Austr. Bds., Addenda, p. 12 (1888).

A set of two taken on the 1st October, 1868, measures:—Length (A) 0·77 × 0·57 inches; (B) 0·8 × 0·58 inches. A set of two taken by Mr. C. G. Gibson at Broad Arrow in September 1902, are of a rich yellowish-buff ground colour spotted and blotched on the larger end with chestnut and reddish-brown, and are sparingly marked with the same colours over the remainder of the shell. Length (A) 0·79 × 0·61 inches; (B) 0·82 × 0·63 inches.

Mr. C. G. Gibson writes me from Western Australia:—"I found a number of nests of the Long-billed Honey-eater at Broad Arrow during September 1902. They were built from two to five feet from the ground and in several instances on the upright fork of a sandal-wood tree. The eggs were usually two, but occasionally three for a sitting. The birds all sat very close, but when once disturbed from the nest were extremely shy. A nest I found on the 3rd September 1903, at Lake Austin, built in a low bush, contained three half-grown young."



NEST AND EGGS OF THE LONG-BILLED HONEY-EATER

Mr. Gibson has since forwarded me his nesting notes for 1905, in which he records finding in the vicinity of the Mount Margaret Goldfield, Eristown District, on various dates between the 21st June and the 13th of September, thirty-six nests of this species. Some were in course of construction, most of the nests contained two eggs, only one set of three being found, the remainder contained young. The nests were built generally in the upright forks of low bushes principally mulga and salt-bush, at a height varying from eighteen inches to three feet from the ground, but one found on the 12th September, containing two incubated eggs, was built in the

vertical fork of a dead mulga at a height of eight feet. Of unusual sites, one found on the 21st July was in the top of a hollow stump two feet from the ground and contained a recently broken egg. On the 13th September another was found behind a loose piece of bark of a dead mulga, eighteen inches from the ground, containing two young.

Mr. Tom Carter writes me from South-western Australia:—"Meliornis longirostris is very numerous about Albany. A nest with two fresh eggs was noted at the Quarantine Station there on the 14th February, 1905." Mr. Carter also forwarded to the Trustees of the Australian Museum, a nest and set of two eggs taken by him at Broome Hill, on the 6th July, 1906.

July and the four following months constitute the usual breeding season, but doubtless like *Meliornis nova-hollandiæ*, it breeds freely again in the autumn, odd nests being found throughout the remaining months of the year.

Meliornis sericea.

WHITE-CHEEKED HONEY-EATER.

Meliphaga sericea, Gould, Proc. Zool. Soc., 1837, p. 144; *id.*, Bds. Austr, fol., Vol. IV., pl. 25 (1848).

Meliornis sericea, Gould, Handbk. Bds. Aust. Vol. I., p. 490 (1865); Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 254 (1884).

ADULT MALE—*Like the adult male of MELIORNIS NOVE-HOLLANDIÆ, Latham, but having a white superciliary stripe extending from the sides of the forehead—where it is very wide—on to the nape, and a conspicuous fan-shaped tuft of white plumes, commencing on the cheeks, spreading out and concealing the feathers at the side of the throat and neck; chin and centre of the throat black; tips of the inner webs of the lateral tail feathers indistinctly margined with white; bill black; legs and feet dusky-grey; iris blackish-brown. Total length in the flesh 7 inches, wing 3, tail 2·8, bill 0·8, tarsus 0·8.*

ADULT FEMALE—*Similar in plumage to the adult male but slightly smaller.*

Distribution—Queensland, New South Wales.



WHITE-CHEEKED HONEY-EATER.

ALTHOUGH the range of the White-cheeked Honey-eater extends over most of the coastal districts of Eastern Australia, New South Wales is the stronghold of this species. In general appearance it resembles *Meliornis nove-hollandiæ*, and is often found frequenting the same situations but is far more local in habits. Near Sydney it is very common in the swampy undergrowth between Manly and Newport, and on the shores of Narrabeen Lagoon giving preference for those localities where ferns and cycads flourish, overrun in parts with a tangled undergrowth of climbing plants, sheltered above by wide-spreading

Eucalypti. At Roseville, Middle Harbour, Thornleigh and Hornsby it frequents the forest lands with a thick scrubby undergrowth of stunted *Banksias* and *Eucalypti*. It is common also about the Hawkesbury River, George's River, and Cook's River, its presence being an almost certain indication that water is near at hand. While at Copmanhurst on the Upper Clarence River, Mr. George Savidge showed me a skin of this species also its nest and eggs that he had obtained in that district. In some specimens the white superciliary stripe is connected with a broad band of white-tipped feathers on the forehead. Specimens from Cairns and Cardwell in North-eastern Queensland, are smaller than examples obtained near Sydney, averaging 6 inches in length and the wing measurement 2·6 inches.

Gould states that it is a remarkably shy species, and that he had much difficulty in getting within gunshot of it. This is the reverse of my experience, for as a rule when disturbed, it generally perches near the end of a dead lower lateral branch of a lofty tree, or flies from shrub to shrub, and I could always obtain as many specimens as were required. That it is unsuspecting in habits is further evidenced by the fact that among a number of specimens received in the flesh at the Australian Museum, the result of a day's shooting with two guns, nineteen of the birds belonged to this species. In a gully near Middle Harbour I watched these birds bathe in a

shallow rock pool. They simply darted off a branch into the water and out again as quickly as possible. Both near Canterbury and at Roseville, I have seen these birds, on rare occasions, during the hot summer months in lofty *Eucalypti* around my house.

It utters a clear double whistling note, which may be easily distinguished from the shrill call of its compeer, *Meliornis nova-hollandiæ*. It is often uttered rapidly for several times in succession, and more particularly when it mounts up with a zig-zag flight for some distance in the air.

Stomachs of these birds examined contained the remains of insects, principally small black beetles; its food also consists of the pollen and nectar of flowers.

The nest is a cup-shaped structure, roughly formed externally of strips of bark, wiry plant-stems and grasses, and often has a flat platform around the rim of varying width, the inside of the nest being lined with dried grasses or when procurable the thread-like leaves of *Casuarina suberosa*, and at the bottom with the downy tufts of *Banksia* cones, silky grass-seeds, small dead flowers, or other soft material. An average nest measures externally four inches and a quarter in diameter, by two inches and a half in depth, and the inner cup one inch and three-quarters in diameter by one inch and a half in depth. They are usually well concealed and built near the ground, sometimes resting on it at the bottom of a clump of Sword-grass or fern, or among the lower thin dead twigs of a tea-tree or gum sapling, and partially concealed with standing dead grass-stalks. More often they are placed in thick upright forks of shrubs within three or four feet of the ground, and occasionally in a tea-tree at an altitude of fully twenty feet.

As a rule the nests of this species are built in positions that are furthermore sheltered above with a canopy of leaves and branches of trees of a considerably taller growth. An exception was a nest I found at Middle Harbour on the 5th August, 1900, while looking for those of *Glycyphila fulvifrons*. Out on a heath-land and well away from any high timber, I was surprised to flush a White-cheeked Honey-eater from some Dwarf Apple-trees (*Angophora cordifolia*) and found its nest built in the fork of one of these trees about two feet from the ground; it contained two fresh eggs.

The eggs are two in number for a sitting, elongate oval in form, the shell being close-grained, smooth, and almost lustreless. They vary in ground colour from a pale yellowish to a faint reddish-buff freckled and spotted with reddish-chestnut or chestnut-brown, the markings usually being sparingly but uniformly distributed over the shell; in others they predominate or are almost confined to the larger end where they sometimes assume the form of a zone. A set of two taken at Middle Harbour, on the 5th August, 1900, measures:—Length (A) 0·78 × 0·58 inches; (B) 0·77 × 0·58 inches. A set of two taken at Roseville, on the 9th October, 1898, measures:—Length (A) 0·83 × 0·6 inches; (B) 0·82 × 0·61 inches. Typically the eggs of this species may be distinguished from those of *Meliornis nova-hollandiæ*, by being more elongate, of a slightly richer ground colour, and less conspicuously marked.

Young birds have the upper parts brown, some of the feathers on the centre of the back blackish-brown with faint yellowish-white margins, the wings and tail resemble those of the adult, but the outer webs of the greater series of the upper wing-coverts show traces of indistinct yellowish margins; crown of the head brown, forehead blackish-brown; sides of the head black, the superciliary stripe being much narrower than in the adult and of a faint yellowish-white; the sides of the forehead, chin and throat dusky-brown; remainder of the under surface dull white, washed with brown on the sides of the lower breast and abdomen, most of the feathers being centred with blackish-brown, more broadly on the upper breast; bill blackish-brown, basal half of lower mandible yellowish-brown. Wing 2·7 inches.

Like its ally *M. nova-hollandiæ*, this species has two distinct breeding seasons in the year. In the neighbourhood of Sydney the autumn breeders commence to build at the end of March,

and nests with eggs or young are fairly plentiful during the two following months. Occasionally nests may be found with eggs in June, but they are most numerous in July and August. Nests with fresh eggs may also be found in October, and again as late as the end of December. Usually the actions of the birds betray the vicinity of the nest. At Willoughby, on the 22nd April, 1899, while searching in the undergrowth for a nest, one of the birds, probably the female, tried to lure me away by feigning a broken wing. The nest I found built a few inches from the ground, under the shelter of a small tree, contained two young ones, who as I approached scrambled out of the nest and took refuge in the surrounding scrub.

At Copmanhurst Mr. G. Savidge has found nests containing young in July, and others with eggs in August and September. Mr. Savidge informs me that these nests were built in rushes, tufts of long coarse grass, and low undergrowth.

The nest figured on Plate A. 11, containing two fresh eggs was taken by me at Roseville, on the 9th October, 1898. Externally it is roughly and irregularly formed of very thin wiry plant stems resting on a base consisting entirely of strips of red stringybark, a few pieces of the latter material also being worked into the platform around the sharply defined cup-like cavity. The inner walls are lined entirely with the thread-like leaves of the *Casuarina*, and the bottom of the structure with the dark red velvety tufts of *Banksia* cones. It averages externally four inches and a half in diameter by two inches and three-quarters in depth; the inner cup, one inch and three-quarters in diameter by one inch and a half in depth. This nest was built about eight inches from the ground among some bracken ferns (*Pteris aquilina*), and was partly sheltered on one side by a dead leafy branch of a low gum sapling.

Meliornis mystacalis.

MOUSTACHED HONEY-EATER.

Meliphaga mystacalis, Gould, Proc. Zool. Soc., 1840, p. 161; *id.*, Bds. Austr., fol., Vol. IV., pl. 26 (1848).

Meliornis mystacalis, Gould, Handbk., Bds. Austr., Vol. I., p. 491 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 255 (1884).

ADULT MALE.—*Like the adult male of MELIORNIS SERICEA, Gould, but having only a few of the small feathers on the centre of the forehead slightly tipped with white, the feathers on the lower throat are rich dark brown, instead of black, and the tuft of white plumes commencing on the cheeks and spreading over the sides of the throat and neck is longer, narrower, and lanceolate in form, the point terminating towards the back. Total length of skin, 6·6 inches, wing 3, tail 2·8, bill 0·92, tarsus 0·85.*

ADULT FEMALE.—*Similar in plumage to the male, but slightly smaller.*

Distribution.—Western Australia.

NO form of the White-cheeked Honey-eater is found in South Australia, but the present species is an extreme western representative of *Meliornis sericea*, from which it differs in the characters pointed out in the above description. Typically it has a longer bill than the eastern form; fewer of the small black feathers too on the forehead are tipped with white, and in one specimen now before me, the black feathers at the base of the culmen are entirely devoid of these white tips. Mr. George Masters obtained five specimens while collecting on behalf of the Trustees of the Australian Museum, at King George's Sound, Western Australia, in 1866 and 1868, but did not succeed in finding the nest and eggs. Mr. Tom Carter informs me that it occurs sparingly near Albany and Perth.

In his "Handbook to the Birds of Australia,"* Gould, quoting Gilbert's notes, remarks of this species:—"It is a very early breeder, young birds ready to leave the nest being found on the 5th August; it has also been met with breeding as late as November; it doubtless, therefore, rears more than one brood in the course of the season. The nest is generally built near the top of a small, weak, thinly-branched bush, of about two or three feet in height, situated in a plantation of seedling mahogany or other *Eucalypti*: it is formed of small dried sticks, grass, and narrow strips of soft bark, and is usually lined with *Zamia* wool; but in those parts of the country where that plant is not found, the soft buds of flowers, or the hairy flowering parts of grasses, form the lining material, and in the neighbourhood of sheep-walks wool collected from the scrub. The eggs are usually two in number. They are nine lines long by seven lines broad, and are usually of a dull reddish-buff, spotted very distinctly with chestnut and reddish-brown, interspersed with obscure dashes of purplish-grey."

Gilbert's remarks as to its varied flight, habit of mounting in the air and notes, are equally applicable to the eastern species, *Meliornis sericea*.

Meliornis australasiana.

HORSE-SHOE HONEY-EATER.

Certhia australasiana, Shaw, Gen. Zool., Vol. VIII, p. 226 (1812).

Meliphaga australasiana, Gould, Bds. Austr., fol., Vol. IV., pl. 27 (1848).

Lichmera australasiana, Gould, Handbk. Bds. Austr., Vol. I., p. 493 (1865).

Meliornis australasiana, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 252 (1884).

ADULT MALE—General colour above dull ashy-grey slightly tinged with olive; upper tail-coverts blackish-brown; upper wing-coverts blackish-brown; quills dark brown margined externally with golden-yellow except on the two outermost primaries, and the apical portion of most of the remainder of the primaries; tail feathers blackish-brown externally margined for two-thirds of their length from the base with golden yellow, the apical half of the inner web of the outermost feather white, the inner webs of the next two feathers on either side with a large oval spot of white, but decreasing in size towards the central pair; head dull ashy-grey, the feathers on the forehead and crown with indistinct blackish-brown central streaks; lores, feathers in front and behind the eye blackish, those behind the eye bordered above with a narrow white line; ear-coverts dull ashy-grey; cheeks and throat dull white, each feather having a narrow blackish-brown central streak; fore neck and chest white, the latter with a broad crescentic dull black bar on either side; centre of the breast and the abdomen dull white, remainder of the under surface dull grey slightly tinged with brown, which is more distinct on the sides of the abdomen; under tail-coverts white with broad dull grey centres. Total length in the flesh 6.25 inches, wing 2.9, tail 2.5, bill 0.7, tarsus 0.8.

ADULT FEMALE—General colour above olive-brown; lesser and median upper wing-coverts like the back, the greater wing-coverts and primary coverts blackish-brown, narrowly edged externally with olive; quills dark brown externally edged with dull olive-yellow; tail feathers dark brown margined externally with olive-yellow, but decreasing in extent towards the outermost feathers on either side which have indications of dull whitish tips on their inner webs; head olive brown, lores dusky-brown; the feathers behind the eye have a slight dusky wash, above which is a very faint yellowish-white line, the character of the markings on the under surface are similar to those on the male but are different in colour, being a dull brown slightly tinged with olive, becoming somewhat darker on the crescentic bar on each side of the chest, and the feathers on the fore neck as well as those on the throat are narrowly streaked with dull brown.

Distribution—New South Wales, Victoria. South Australia. Tasmania.

* Gould, Handbk. Bds. Austr., Vol. I., p. 492, (1865)

THIS species originally described by Dr. George Shaw in his "General Zoology"* in 1812 as the "Australasian Creeper," *Certhia australasiana*, is an inhabitant of the south-eastern portion of the continent, some of the larger islands of Bass Strait, and Tasmania. It is familiarly known both in Australia and Tasmania as the "Horse-shoe Honey-eater," both sexes having a crescentic marking on each side of the chest, these parts being black in the male and dull brown tinged with olive in the female.

Gould, who uses the vernacular name of Tasmanian Honey-eater for this species in his folio edition of the "Birds of Australia,"† remarks:—"This little Honey-eater is abundantly dispersed over every part of Van Diemen's Land, to which country, in all probability, the species is restricted, though there is another in South Australia and New South Wales so nearly resembling it, as to render this supposition doubtful, and a further acquaintance with the continental bird is necessary to determine whether it is a mere variety or a distinct species. The chief difference consists in its being smaller in size, and less brilliantly marked on the wing." Prior to 1865, Gould apparently regarded the continental and Tasmanian birds as alike, for he makes no further reference to it in his "Handbook to the Birds of Australia,"‡ but there gives Tasmania, South Australia and New South Wales as the geographical distribution of this species.

In South Gippsland, Victoria, this species was not uncommon in the swampy undergrowth at the foot of the Strzelecki Ranges. In South Australia the late Mr. F. W. Andrews regarded it as a rare bird, and stated its principal haunts were Mount Compass, and the deep rocky thickly timbered gullies running into the neighbouring ranges. Mr. Edwin Ashby writes me:—"Meliornis australasiana is comparatively rare near Adelaide, and is more often met with in the wildest parts of the Mount Lofty Range."

In New South Wales it is one of the commonest species in the dense undergrowth of the valleys and the precipitous rocky gorges of the higher portions of the Blue Mountains. In the vicinity of Katoomba, Leura, and Wentworth Falls, I have often watched these birds dart from some bush on a rocky headland, launch out into the azure space uttering at the same time a shrill note, and with a zig-zag flight disappear in the foliage far below. It is equally numerous in the humid ranges of the Illawarra District. Near Sydney it is rarely met with. At Willoughby and Roseville I have seen it on several occasions frequenting the same situations as *Meliornis sericea*, principally the undergrowth and low ferns on creek banks, sheltered above with trees of a larger growth. Although very common during spring and summer on the Blue Mountains I have noted it is just the reverse during winter.

Dr. L. Holden writes me from Tasmania:—"Lichmera australasiana haunts gardens in villages and suburbs. A fuchsia bush has a great attraction for it. Four species of our Honey-eaters may be often seen in gardens, but this one is by far the commonest. Its varied and vigorous calls outside my bedroom window have advised me of the approach of spring for many a year. No bird rises earlier or utters its note so soon. The loudness, stridency, and variety of the cries of this very familiar bird make the Horse-shoe Honey-eater the best known to Tasmanians of any of its family. Of nests seen, one was in a most remote and desolate spot, another between a garden and a street in a rather busy village. One in a tea-tree overhanging the shore of Bass Strait was built of dry ribbon-like seaweed as a base, on which a cup of fine dry grass, without other lining was constructed; this had three fresh eggs on 3rd November. I saw a pair building on the 6th September, and found newly hatched young on the 27th November. I have seen the hen bird twisting off dry tendrils from a laburnum tree to build her nest in the adjoining hedge, and flying from one tendril to the other till she found one dry and loose enough to be pulled off. The cock bird did not carry materials, he kept at hand however, and drove away

* Gen. Zool., Vol. VIII., p. 226 (1812).

† Gould, Bds. Austr., fol. ed., Vol. IV., pl. 27, 1848.

‡ Gould, Handbk Bds. Austr., Vol. I, p. 493 (1865).

other birds from the nest, the constant Sparrow, the occasional White-eye. Once I saw the hen humbly and vainly try to dislodge a quite unconcerned Sparrow, the next moment the Sparrow was fleeing for his life fiercely pursued by the male Honey-eater."

Mr. E. D. Atkinson also sends me the following note from Tasmania:—"My brother, the Rev. H. D. Atkinson, found a nest of *Lichmera australasiana* at Circular Head, on the 3rd December, 1889, containing two eggs, and another at Evandale on the 29th September, 1896, with three eggs. Each nest was built in a tea-tree."



A HAUNT OF THE HORSE-SHOE HONEY-EATER.

For an opportunity of giving a representation of a haunt of the Horse-shoe Honey-eater I am indebted to Messrs. Kerry and Co., Sydney, who kindly presented to the Trustees of the Australian Museum a photograph of the gorge at the Valley of Waters, for the purpose of reproducing the accompanying plate. The Valley of Waters is situated at Wentworth Falls on the Blue Mountains, sixty-one miles west of Sydney and two thousand eight hundred and forty-four feet above the level of the sea.

The nest is a thick walled open cup-shaped structure and varies in the materials used for its construction. It is generally irregularly formed externally of thin strips and scales of bark, dead leaves

and dried grasses slightly held together with spiders' web and plant down, the inner cup being neatly lined at the bottom with hair or fur, with which one or two feathers are sometimes intermingled. Others have no binding material, either of spiders' web or plant down, but are formed throughout of strips and scales of bark, dead leaves and dried grasses, and have a slight lining only of finer dead grasses and very fine fibrous rootlets. Of the latter type is a nest in the Australian Museum collection taken by Mr. S. W. Moore, at the Valley of Waters, Wentworth Falls, on the 23rd January, 1897. It was built in a clump of ferns, and contained an addled egg. Another nest in the Group Collection, taken by the late Mr. Henry Grant at Lithgow, has a large piece of paper worked into the outer portion of one side. An average nest

measures externally four inches and a quarter in diameter by two inches and three-quarters in depth, the inner cup measuring two inches in diameter by one inch and three-quarters in depth. They are usually built near the ground in a clump of ferns or low shrub. One found by Mr. W. L. Moore, at Waterfall, on the 18th October 1899, containing two fresh eggs, was, he informs me, built at the base of a low scrubby bush amongst a heap of débris collected there apparently by storm-water.

The eggs are usually three in number for a sitting, oval in form and pointed at the smaller end, the shell being close-grained, smooth, and slightly lustrous. They vary in ground colour from a very pale salmon to a faint reddish or a fleshy-buff, becoming darker towards the larger end, where they are spotted, blotched or have small irregular shaped markings of chestnut-brown or purplish-brown, some specimens have a few underlying markings of dull purplish-grey. Many of the markings are penumbral, nearly all are of irregular shape, and specimens may be found distinctly zoned, while others have the markings scattered over the larger end, and forming here and there small confluent patches. A set of three taken near Hobart, in October, 1885, measures:—Length (A) 0.75 × 0.56 inches; (B) 0.75 × 0.58 inches; (C) 0.74 × 0.57 inches. Another set of three measures:—Length (A) 0.78 × 0.59 inches; (B) 0.7 × 0.56 inches; (C) 0.73 × 0.56 inches.

Young birds of both sexes resemble the adult female, but are duller in colour, and the crescentic bar on each side of the chest is smaller and less distinct.

September and the four following months constitute the usual breeding season of this species.

Genus GLYCYPHILA, Swainson.

Glycyphila fulvifrons.

FULVOUS-FRONTED HONEY-EATER.

Meliphaga fulvifrons, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 317 (1826).

Certhia fulvifrons, Lewin, Bds. New Holl., pl. 22 (1838) *teste* Gadow.

Glycyphila fulvifrons, Gould, Bds. Aust. fol. Vol. IV., pl. 28 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 495 (1865); North, Rec. Austr. Mus., Vol. VI., p. 124, (1906).

Glycyphila fulvifrons, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 210 (1884).

ADULT MALE—*General colour above ashy-brown slightly tinged with olive, the feathers on the back with a broad submarginal streak of dark brown on either side; upper tail-coverts greyish-brown; lesser wing-coverts like the back, the median and greater coverts dark brown, externally margined with dull yellowish-white; primary coverts and quills dark brown externally edged with olive-yellow, the innermost secondaries with dull whitish margins; tail feathers dark brown, narrowly edged with ashy-brown; forehead and occiput reddish-fulvous; a stripe extending from the nostril over the eye white; lores, a narrow line of feathers below and behind the eye, and the ear-coverts blackish-brown, longer feathers of the latter margined with fulvous-white; chin, centre of the throat, chest, and breast—separated from the sides of the neck, chest, and breast—which are ashy-brown tinged with olive—by a broad line of blackish-brown feathers extending on either side from the ear-coverts towards the centre of the breast, where it is broken, giving these parts a mottled appearance: some of the longer feathers on the sides of the breast reddish-fulvous; centre of the abdomen white, the sides ashy-brown with a slight fulvous wash; under tail-coverts white with greyish-brown centres; inner margins of quills and under wing-coverts reddish-fulvous; bill black; legs and feet leaden-grey; iris blackish-brown. Total length in the flesh 7 inches, wing 3.2, tail 2.8, bill 0.8, tarsus 0.88.*

ADULT FEMALE—*Similar in plumage to the male but slightly smaller.*

Distribution—New South Wales, Victoria, South Australia, Kangaroo Island, Western Australia, Tasmania, and the larger Islands of Bass Strait.

THE range of the Fulvous-fronted Honey-eater extends over the southern portions of the Australian continent, the larger islands of Bass Strait, and Tasmania. It is principally an inhabitant of the coastal districts, open heath lands or sandy wastes with a stunted and scattered vegetation being its favourite haunts. Near Sydney, it is a common resident at Botany, La Perouse and Middle Harbour, resorting chiefly to those parts, more or less covered with *Grevilleas* and *Banksias*, and in which the Grass-tree (*Xanthorrhœa hastata*) flourishes. At Chatswood and Roseville during September and October, I was surprised to see it frequenting the larger *Eucalypti* in the open forest lands, my attention in each instance being attracted to it by its weird notes. When disturbed it mounts high in the air and usually flies to a long distance, uttering at the same time its mournful and plaintive notes, and which may also be often heard while the bird is clinging to the stalk of a Grass-tree. As a rule it is a shy species, but while walking along a main road to Middle Harbour, one of these birds settled within three feet of me. They are, too, less cautious when searching for food on the long flowering spikes of the Grass-trees in June and July, where I have often seen them in company with *Melithreptus brevirostris*, *Meliornis sericea*, *Ptilotis fusca* and *P. chrysopt.* In the Illawarra District it may too be frequently seen extracting nectar or insects from the corolla of the many flowers on the crown of the long stem of the Gigantic Lily (*Doryanthes excelsa*). The stomachs of these birds examined contained the remains of insects, principally of small beetles.

Mr. Edwin Ashby writes me as follows from Blackwood, South Australia:—" *Glycyphila fulvifrons* often visits my garden. During the spring of 1904, a male used to frequently perch on one of the wire arches, and seemed to get quite used to the presence of people, singing freely when one was standing unconcerned, only a few yards off."

Mr. W. W. White informs me that he found this species breeding on Kangaroo Island, South Australia, in September, 1893.

From Western Australia, Mr. Tom Carter writes me:—" *Glycyphila fulvifrons* is very numerous around Albany. Nests with recently hatched young were found up to 16th February, 1905, and one nest with two fresh eggs on the 23rd February."

The following notes were received while Dr. L. Holden was resident at Circular Head, Tasmania,—"On the 3rd November, 1886, I found three nests of *Glycyphila fulvifrons*, all within six inches of the ground. One built in a *Melaleuca* had a lining of white *Epacris* bloom, some feathers and a little wool, another in a *Banksia* was lined with a good many feathers of the Swamp Parrakeet (*Pezoporus formosus*), and the third in an *Epacris* contained a number of the dried yellow blossoms of a *Mimosa*. There were two eggs in each nest."

The nest is a deep cup-shaped structure, outwardly formed of strips of bark and is lined inside with dried grasses, and at the bottom with either small dead flowers, downy grass seeds, pieces of Flannel Flower, or the velvety tufts of *Banksia* cones. Two nests received from Mr. C. French, Junr., that were taken in the mallee scrub in North-western Victoria, were lined with feathers, and a combination of rabbit fur and plant down. An average nest measures externally three inches and a quarter in diameter by three inches and a half in depth, and the inner cup two inches in diameter by two inches in depth. Generally it is slightly attached at the sides of the rim and rests between several thin upright stems within six or eight inches from the ground, sometimes it is placed upon it, and occasionally it is built as high as three feet. At Botany and Middle Harbour I usually found them in the rigid stems of a species of dwarf *Leptospermum*, also in *Epacris*, *Isopogon*, low *Banksias* and *Eucalypti*. Little preference is shown, however, and any shrub is utilized as a nesting site, also low ferns, the shelter of a tuft of herbage, or the drooping leaves of a Grass-tree.

I found the nest figured at Middle Harbour on the 29th January, 1899, by flushing the bird almost at my feet. It contained two eggs in an advanced stage of incubation. Approaching the nest cautiously half an hour later, I got within a yard of the female who sat watching me, and did not forsake her eggs until I attempted to get still nearer to her. The nest was built between several rigid leafy stems of an *Isopogon ancaethifolia*, the bottom of the structure being eight inches from the ground. This shrub is also a favourite nesting site for *Hylacola pyrrophygia*.



NEST OF THE FULVOUS-FRONTED HONEY-EATER.

Externally the nest is formed of strips of bark, some being broad and short, others narrow and long completely encircling the structure, inside it is lined with fine dried grasses and at the bottom with the red velvety tufts from *Banksia* cones, intermingled with a few small white flowers. Externally it measures three inches and a half in diameter by three inches and three-quarters in depth, the inner cup measuring two inches in diameter by two inches in depth.

The eggs are usually two, rarely three in number for a sitting, oval, rounded oval, or elongate oval in form the shell being close-grained, smooth, and lustreless, and vary considerably in the disposition of their markings. They are pure white and are sparingly dotted and spotted with different shades, varying from pale chestnut-brown to rich red; on many specimens the markings are penumbral, and they are as a rule confined to the larger end. Some have small faint chestnut-brown blotches with darker overlying dots and spots, and I have found one egg of a set pure white, and entirely devoid of markings. Typically the eggs may be distinguished from those of any other Honey-eater by the sparseness and washed out appearance of their markings, and approach more closely a variety of the egg of *Ptilotis leucotis*. Specimens however, may be found with the markings of a rich red. A set of two taken at Middle Harbour, on the 1st September, 1900, measures:—Length (A) 0·87 × 0·62 inches; (B) 0·88 × 0·62 inches. A set of three in the Australian Museum collection, taken by Mr. A. F. B. Hull, at Freshwater, near Manly, on the 8th November, 1903, measures:—Length (A) 0·77 × 0·61 inches; (B) 0·8 × 0·62 inches; (C) 0·8 × 0·62 inches.

Young birds resemble the adult but have most of the feathers of the upper parts narrowly centred with whity-brown and the wings and tail feathers duller in colour; the forehead only has a reddish-fulvous wash; a small spot in front of the eye and the ear-coverts brown; chin and upper throat pale yellow; lower throat dull white; remainder of the under surface browner than that in the adult with sagittate markings of blackish-brown on some of the feathers on the upper breast. Wing 3 inches. The last trace of immaturity is exhibited in a few yellow feathers on the centre of the upper throat.

Although the breeding season in the neighbourhood of Sydney extends over the greater portion of the year, fresh eggs may be usually looked for, about Middle Harbour and Manly, when the first of the Native Roses (*Boronia serrulata*) are in flower and perfuming the heath and scrub lands this species frequents. On the 6th August, 1900, I saw two birds engaged in lining a nest built on the ground, sheltered slightly by the drooping leaves of a Grass-tree, and from which six days later I took two fresh eggs. On the same day I found a nest in an exposed situation in some stunted herbage, the female remaining sitting until I was quite close to her. On flushing her I discovered a young one just hatched and a chipped egg. Two young birds left the nest as I approached it on the 19th August, the female, feigning a broken wing, and tumbling over and over, while the young ones concealed themselves in the undergrowth. I found another nest on the 1st September, 1900, built in a low bush close to a well frequented path and the female sitting on two fresh eggs. In company with Mr. C. G. Johnston at Middle Harbour, four nests were found on the 3rd September, 1899, one contained a broken egg, another two heavily incubated and recently deserted eggs, another two dead young ones, and the fourth two young just hatched. The latter left the nest on my approaching it on the 30th September, I caught them and after examining them restored them to their parents. The easiest way to find the nests of this species is to walk quietly over their breeding haunts and flush the birds, for when once disturbed, they often fly some distance, and seldom return while an intruder remains in sight. The normal breeding season commences at the latter end of July and continues until the end of December, but nests may also be occasionally found throughout the first six months of the year. Mr. A. F. B. Hull showed me a nest and two fresh eggs of this species he had taken at Freshwater, on the 22nd March, 1901. The nest was built in a low dead bracken fern near the roadside. Another nest he found on the 19th October, 1903, contained three fresh eggs. On the 13th April, 1906, in the same locality, Mr. Hull procured another nest with two fresh eggs.

Mr. W. L. Moore brought me a nest and egg of the Fulvous-fronted Honey-eater for examination he had taken on the 3rd November, 1900, at Loftus, on the Illawarra Railway Line, and also in the same nest an egg of the Pallid Cuckoo. This set I exhibited at a meeting of the Linnean Society of New South Wales in June 1905.

Glycyphila albifrons.

WHITE-FRONTED HONEY-EATER.

Glycyphila albifrons, Gould, Proc. Zool. Soc., 1840, p. 160; *id.*, Ilds. Austr., fol., Vol. IV., pl. 29 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 497 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 211 (1884).

ADULT MALE—*General colour above dark brown, the feathers on the hind neck and back having whitish margins; rump rufous-brown with dark brown centres to the feathers; upper tail-coverts brown, slightly tinged with rufous and broadly centred with dark brown; upper wing-coverts brown, the tips of the median and the outer webs of the greater series with broad whitish margins; quills dark brown margined externally with yellowish-green, except the inner secondaries which are externally margined and narrowly edged at the tip with white; tail feathers dark brown, edged on their outer webs, except on the outermost one on either side, with yellowish-green; crown of the head blackish-brown with very narrow whitish tips; forehead, a broad laral streak and a line retreating from immediately beneath the lower mandible to the ear-coverts, white; a narrow line of feathers below and behind and partially encircling the eye white, succeeded by a broader one of black, which reaches to the gape; ear-coverts blackish-silver-grey, behind which is a patch of white feathers; chin and throat blackish-brown passing into a more decided brown on the fore neck, some of the feathers on the centre of the throat*

having small whitish tips; remainder of the under surface white, the feathers on the sides of the breast and the flanks streaked with blackish-brown; under tail-coverts white narrowly streaked with blackish-brown; under wing-coverts pale fulvous; "bill black; legs and feet grey; iris brown." (Morgan)

ADULT FEMALE—Similar in plumage to the male but the dark brown feathers do not extend quite so low down on the fore neck.

Distribution—New South Wales, Victoria, South Australia, Central Australia, Western Australia, North-western Australia.

THE range of the White-fronted Honey-eater extends over the southern half of the Australian continent, and is chiefly an inhabitant of the dry inland portions of the States. There is an adult male in the Australian Museum collection obtained in the scrub at Middle Harbour, near Sydney in 1878. This is the only instance I have known of its occurrence near the east coast of Australia. Inland it occurs near the Lachlan River, also near Ivanhoe, where the late Mr. K. H. Bennett found it breeding in October 1886. It also frequents the mallee scrub in north-western Victoria, and is apparently widely distributed over the southern portions of South Australia; specimens from the latter State in the Australian Museum collection were procured by Mr. K. Broadbent at Nonning, and by Mr. George Masters at Port Lincoln. Dr. A. M. Morgan met with it at Laura, about one hundred and forty miles north of Adelaide, and again while in company with Dr. A. Chenery, during a trip made from Port Augusta to the Gawler Ranges, in August 1902. In Central Australia in 1894, a single immature male specimen was obtained by the Horn Scientific Expedition, on the Levi Range. Mr. George Masters procured an adult male at Mongup, Salt River Western Australia, in January 1869, Mr. Edwin Ashby met with it at Callion to the north of Coolgardie, and at Point Cloates, North-western Australia, Mr. Tom Carter informs me that it is found both on the coast and inland.

Dr. A. M. Morgan sends the following note relative to the specimens obtained by Dr. Chenery and himself during their trip to the Gawler Ranges:—"Glycyphila albibrons was seen occasionally from Wippippee westwards. They were found in mulga, myall, and bushy country, but not in salt-bush or low mallee. A female shot on the 7th August, at Wippippee, contained a nearly developed egg-yolk but no nests were found."

From Port Augusta Dr. A. Chenery writes me:—"Glycyphila albibrons is an occasional visitor to this town. I saw one or two in April 1904, also in 1905. In March 1902, one was being chased by a *Ptilotis sonora* at the back of my house, and flying at a great rate between two buildings, turned a corner quickly and struck against a weather-board outhouse and fell dead almost at my feet. The pursuer swerved and escaped a similar fate."

While resident at Point Cloates, North-western Australia, Mr. Tom Carter sent me the following notes:—"Glycyphila albibrons is a winter visitor, but if heavy summer rains occur its appearance may be expected shortly after. It was exceedingly abundant in 1898. Patches of tall blue-flowering plants would be alive with these active but extremely shy birds, busily probing the blossoms and frequently uttering a metallic "tink-tink." It has been scarce since then. A few pairs may generally be found in the rocky ranges north of Point Cloates in the winter, but it is very difficult to secure specimens. On the 28th July, 1899, after three hours watching I succeeded in following a pair of these birds to their nest, placed on the top of a dense bunch of prickly spinifex overgrown with creepers. The nest contained young."

Through Mr. C. French, Junr., I have received the following notes from Mr. C. McLennan:—"Glycyphila albibrons is a resident species in the Wimmera District, Victoria, and inhabits the low scrub and mallee. It is a shy but very active bird, of rather rapid flight, and has a beautiful metallic ringing note. It feeds upon nectar extracted from various flowers, principally from the Mallee gum and Honey-suckle scrub, also small insects. The nest is usually built in a fork of a dead shrub within one to three feet from the ground, generally in dead Acacias. I have also

found them on the top of a bunch of dead Porcupine grass. Two eggs are laid for a sitting. The breeding season usually commences in August and continues until the end of November, but in wet seasons it begins earlier."

Two nests received from Mr. Charles French, Junr., taken by Mr. C. McLennan on Pine Plains Station in the Wimmera District, Victoria, in September, 1902, are cup-shaped structures formed principally of soft dead greyish-white blades of grass with which are intermingled externally some spider's web and cocoons and a few small feathers; one is lined entirely with sheep's wool, in which is worked in and out a long piece of soft white cotton; the other is scantily lined at the bottom with some downy white seeds. They are alike in size and measure externally three inches in diameter by two inches and a quarter in depth, the inner cup measuring barely two inches in diameter by one inch and a half in depth.

The eggs are two in number for a sitting, oval in form, the shell being close-grained, smooth, and slightly lustrous. They vary from a very faint reddish-buff to a buffy-white ground colour, which is distinctly spotted, but particularly on the larger end, with different shades of reddish-chestnut, intermingled with similar underlying markings of dull purplish-red or purplish-grey. Some specimens have large irregular-shaped blotches or smears of faint chestnut or chestnut-brown; in others the markings are penumbral, or have small darker and richer coloured spots overlying the fainter subsurface markings. Typically they may be easily distinguished from those of the preceding species by their richer ground colour and markings. A set taken by the late Mr. K. H. Bennett, in October, 1886, at Ivanhoe, New South Wales, measures:—Length (A) 0·78 × 0·57 inches; (B) 0·82 × 0·52 inches. Another set of two measures:—Length (A) 0·78 × 0·57 inches; (B) 0·78 × 0·55 inches. A set in Dr. A. M. Morgan's collection taken near Laura, about one hundred and forty miles north of Adelaide measures:—Length (A) 0·79 × 0·57 inches; (B) 0·8 × 0·57 inches.

Young birds are brown above, wings brown, some of the greater coverts and the secondaries margined with whity-brown on their outer webs; tail feathers brown with paler brown margins; head, ear-coverts, and sides of the neck brown; chin and upper throat dull white, passing into fulvous-brown on the fore neck, where together with some of the feathers on the upper breast are dark brown except on their margins; remainder of the under surface dull white slightly washed with fulvous-brown; under tail-coverts dull white centred with blackish-brown; "bill brown the under mandible yellow at the base; legs and feet bluish-grey, iris brown." (Bennett).

Glycyphila fasciata.

FASCIATED HONEY-EATER.

Glycyphila fasciata, Gould, Proc. Zool. Soc., 1842, p. 137; *id.*, Bds. Austr., fol., Vol. IV., pl. 30 (1848); *id.*, Handbk. Bds. Aust. Vol. I., p. 499 (1865).

Glycyphila fasciata, Gadow, Cat. Bds. Brit. Mus Vol. IX., p. 212 (1884).

ADULT MALE—*General colour above brown slightly tinged with buff on the rump and upper tail-coverts; mantle and back dark brown with ill-defined buffy-brown margins to most of the feathers; lesser upper wing-coverts like the back, but with much narrower and paler margins, median and greater coverts and quills brown externally margined and tipped, except the outermost primaries, with whity-brown; tail feathers brown, narrowly edged with whity-brown; forehead and crown of the head blackish-brown, each feather narrowly margined with white at the tip; sides of the head and ear-coverts faint buffy-white, passing to pure white on the centre of the throat; a narrow brownish-black line extends from the base of the lower mandible down each side of the throat; remainder of the under surface white, each feather on the fore neck and sides of the chest having a subterminal blackish-brown*

cross-bar, the bars decreasing in size on the sides of the upper breast and passing into a longitudinal streak on the flanks, which are faintly tinged with creamy-buff; under tail-coverts pale creamy-buff, some of the longer feathers having a narrow dark brown shaft streak; "bill greenish-grey, feet aurora-red, iris reddish-brown."—(Goold). Total length 4·7 inches, wing 2·8, tail 1·9, bill 0·5, tarsus 0·7.

ADULT FEMALE—The sexes are alike in plumage.

Distribution—Queensland, Northern Territory of South Australia, North-western Australia.



FASCIATED HONEY-EATER.

AN interest is attached to the modestly plumaged little Honey-eater figured on this page, also to the next species of the genus *Glycyphila*, inasmuch as they are the only members of the large family *Meliphagida*, inhabiting Australia, who form covered or dome-shaped nests, the remainder constructing open or cup-shaped structures.

The present species is distributed chiefly over the coastal and contiguous districts of Queensland, the Northern Territory of South Australia, and the adjoining portion of North-western Australia. There are specimens in the Australian Museum collection, from the former State, obtained by Mr. J. Rainbird at Port Denison, and by the late Mr. George Barnard at Duaringa. In the Northern Territory of South Australia, Mr. A. Morton obtained it at Port Essington, and in the Kimberly District of North-western Australia, numerous nests were found in 1901 in the trees overhanging creeks, by Mr. Chas. G. Gibson, a member of the Brockman Exploring Expedition. The breeding season was over, and of many nests examined only one contained an egg, which Mr. Gibson showed me when passing through Sydney. I have also examined a nest and set of two eggs taken in the Northern Territory of South Australia, in January 1902.

The late Mr. George Barnard of Coomoolaroo, Duaringa, Dawson River, Queensland, forwarded me the following note when sending the eggs of this species:—"The nest of *Glycyphila fasciata* is a large dome-shaped structure, with a hole in the side, and is composed entirely of the paper-like bark of a *Melaleuca*, coarse strips outside, finer inside, and is fastened to the thin twigs of a tea-tree overhanging and within three or four feet of the water, always as far as we have found over a water hole." His son, Mr. H. G. Barnard, in 1905, wrote me:—" *Glycyphila fasciata* used to breed freely here, attaching their nests to twigs overhanging water, when there were a number of fine water holes in the creeks, but at present they are and have been for a long time past owing to the continued dry weather a level bed of sand."

A nest of this species in the Australian Museum collection, is a dome-shaped structure formed entirely of strips of the paper-like bark of a *Melaleuca*, broad strips externally and narrow ones internally, with a few broad pieces at the bottom. The outer measurements are six inches in length, four inches in width, and across the entrance one inch and a half.

The eggs are usually two rarely three in number for a sitting, elongate oval in form, the shell being smooth and lustreless. Some specimens are freckled and dotted all over with light red or reddish-brown, the markings predominating around the thicker end where they are often confluent and form a well defined zone. Others have the markings small, less numerous, and evenly distributed over the shell. Another type has distinct spots and medium-sized irregular-shaped blotches of different shades of purplish-red and purplish-brown, many of the darker markings partially overlying the lighter ones, and all confined chiefly to the larger end. A set of two taken by the late Mr. George Barnard, at Duaringa, Queensland, in December 1890, measure—Length (A) 0·8 × 0·55 inches; (B) 0·81 × 0·55 inches. A set of three taken by

Mr. H. G. Barnard on the 15th November, 1893, in the same locality, measures:—Length (A) 0·79 × 0·55 inches; (B) 0·82 × 0·57 inches; (C) 0·82 × 0·57 inches.

October and the three following months constitute the usual breeding season of this species.

Glycyphila modesta.

UNADORNED HONEY-EATER.

Glycyphila modesta, Gray, Proc. Zool. Soc., 1858, pp. 174, 190; Salvad, Orn. Pap. et Molucc. Pt. II., p. 307 (1881); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 215 (1884).

Glycyphila subsfasciata, Ramsay, Proc. Zool. Soc., 1868 p. 385; Gould, Bds. New Guinea, Vol. III., pl. 46 (1876).

ADULT MALE—*General colour above brown, slightly paler on the rump and upper tail-coverts; upper wing-coverts like the back, the greater series edged externally with pale brown, the quills of a darker brown than the back, edged externally with pale brown, these margins being broader and lighter on the innermost secondaries; tail feathers brown, narrowly edged with pale brown, these lighter edges slightly more conspicuous around the tips; forehead and crown of the head brown with darker brown centres, lores dark brown; ear-coverts brown, with narrow white shaft lines and whitish tips; feathers below the eye white, beneath them is a narrow brown line from the angle of the mouth to the ear-coverts; chin, throat, fore neck and upper portion of the breast white, the chin and throat slightly tinged with brown, and the fore neck and upper breast indistinctly barred with brown, sides of the latter brown; remainder of the under surface white; under tail-coverts dull white with the remains of a narrow brown longitudinal streak on one or two of the longer feathers; bill reddish-brown; legs and feet reddish-brown. Total length 5 inches, wing 2·7, tail 1·7, bill 0·5, tarsus 0·6.*

ADULT FEMALE—*Similar in plumage to the male. Wing 2·6 inches.*

Distribution—North Queensland, Southern portion of New Guinea, Aru Islands.

THE Unadorned or Dull-banded Honey-eater chiefly inhabits the coastal districts of North-eastern Queensland, from Cape York to the Herbert River, and also occurs in the southern portions of New Guinea, and in the Aru Islands.

Respecting this species in the Bloomfield River District, Mr. F. Hislop, writes:—“*Glycyphila modesta* is only found in open forest lands, and about tea-tree swamps and waterholes. The nest which is suspended from the end of a leafy branch is dome-shaped, and is made entirely from the bark of the tea-tree. Two eggs are usually laid for a sitting. I have also taken an egg of the Bronze Cuckoo from the nest of this Honey-eater.”

Mr. J. A. Boyd who forwarded me nests and eggs and sent dates of taking eggs in every month of the year except May, June and July, writes:—“I found a nest of *Glycyphila modesta* on the 12th April, 1892, containing two fresh eggs, and nests were very plentiful in December of the same year. I found two nests each with two fresh eggs, on the 6th January 1893, and again on the 19th September and the 27th October, 1893, each with two fresh eggs. On the 18th October, 1894, I took three eggs from an abnormal nest, having fibre intermingled with the tea-tree bark; and on the 18th November, 1895, found a nest with two young ones just ready to fly.”

Mr. A. F. Smith writes from Hambleton, near Cairns:—“*Glycyphila modesta* is common, and generally starts building about the middle of August, usually in trees overhanging water, but sometimes in forest country well away from it. Their nests are also plentiful in the tea-tree swamps near Ingham, and are always built throughout of tea-tree bark. Usually they are dome-shape, but not always, some are deep cup-shape with the edges drawn together so as to

partly hide the eggs. On the Herbert River I found a nest on the 8th March, 1903, with three newly hatched young, but nests with eggs I have most frequently found in September and October.*

A nest received from Mr. Boyd is an elongated pear-shaped structure with a wide mouthed entrance in the side, and is formed throughout of soft yellowish-white paper-like bark of a species of *Melaleuca*, and is suspended from the leafy twigs of one of these trees. It measures externally eight inches in length by four inches in diameter at its widest part, and across the entrance one inch and three-quarters. Internally it measures five inches in height, by two inches and a quarter in breadth.

As pointed out by me in 1889, in the first edition of this work,† it will be observed that both *Glycyphila fasciata* and *G. modesta*, whose habitat is confined to Northern Australia, build dome-shaped nests, while *G. fulvifrons* and *G. albifrons*, which are found in Southern Australia, build open cup-shaped structures.

The eggs of the present species are usually two, rarely three in number for a sitting, varying from elongate and compressed ovals to oval in form, the shell being close-grained, smooth, and usually lustreless. Out of many sets now before me, two only have a slight gloss. They are pure white with very minute but distinct purplish-black dots sparingly scattered over the surface of the shell, predominating as usual on the larger end. Others have a cap only on the larger end formed of almost invisible but not confluent markings or pepperings of purplish-black, while some are entirely devoid of markings. To the naked eye these minute dots appear almost black, but when examined through a lens, the purplish shade is visible in one or more penumbral dots. A set of three (elongated ovals) measures:—Length (A) 0·83 × 0·52 inches; (B) 0·84 × 0·92 inches; (C) 0·83 × 0·51 inches. A set of two (ovals) measures:—Length (A) 0·73 × 0·5 inches; (B) 0·69 × 0·53 inches.

The eggs of this Honey-eater are probably the commonest of any species in the coastal districts of the north-eastern portion of the continent. I have received many sets from Mr. J. A. Boyd while resident at the Herbert River, also from Mr. B. Hislop from the Bloomfield River, and a few sets from Cooktown.

The feathers on the back of immature birds have an ochreous-rufous wash, which is more pronounced on the rump and upper tail-coverts, the upper wing-coverts and quills have ochreous-rufous margins which are more distinct on their outer webs, and the fore neck and sides of the breast are longitudinally streaked with brown. Wing measurement 2·6 inches, almost equals that of the fully adult male.

Genus STIGMATOPS, Gould.

Stigmatops ocellaris.

BROWN HONEY-EATER.

Glycyphila ? ocellaris, Gould, Proc. Zool. Soc., 1837, p. 154.

Glycyphila ocellaris, Gould, Bds. Austr., fol., Vol. IV., pl. 31 (1848).

Glycyphila ocellaris, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 213 (1884).

Stigmatops ocellaris, Gould, Handbk. Bds. Austr., Vol. I., p. 500 (1865); Sharpe, Rep. Voy. H.M.S. "Alert," p. 18 (1884); Salvad., Ann. Mus. Civ. Gen. Vol. 29., p. 502 (1890); North, Trans. Roy. Soc., S.A., Vol. XXII., p. 146 (1898); Hartert, Nov. Zool., Vol. XII., p. 234 (1905).

Glycyphila ? subocellaris, Gould, Proc. Zool. Soc., 1837, p. 154.

* App., p. 389 (1889)

ADULT MALE—General colour above olive-brown passing into fulvous-brown on the rump and upper tail-coverts: upper wing-coverts and quills dark brown, margined externally with greenish-yellow; tail-feathers brown, the central pair washed on both webs, and the remainder margined externally with greenish-yellow; head like the back, but with a slight ashy-grey shade; tips of the feathers below and behind the eye white, followed by a small triangular or an acute-angled patch of short bright yellow feathers: chin, throat and fore neck dull brownish-grey, passing into a dull yellowish-white on the remainder of the under surface and the under tail-coverts; bill blackish-brown; legs and feet grey; iris reddish-brown. Total length in the flesh 5·75 inches, wing 2·7, tail 2·2, bill 0·68, tarsus 0·65.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Queensland, New South Wales, Central Australia, Western Australia, North-western Australia, Northern Territory of South Australia.

REGARDING the characters as untenable upon which Gould founded his *Stigmatops subocularis*, the distribution of the present species extends over the greater portion of the Australian continent. Gould who originally described *Stigmatops ocellaris* in the Proceedings of the Zoological Society, erroneously gives its habitat as Van Diemen's Land, also that of *S. subocularis*, described on the same page, as New South Wales. The latter he united with *S. ocellaris* in his folio edition of the "Birds of Australia,"† but separates it again in his "Handbook to the Birds of Australia," where he states the skin of *S. subocularis* was obtained by Lient. Emery on the north-west coast.

In New South Wales *Stigmatops ocellaris* is freely distributed in favourable situations. I found it fairly numerous in November 1898, in the Red Bottle-brush trees (*Callistemon lanceolatus*), and the Drooping Myrtle or Water Gum (*Eugenia ctenanthe*) overhanging the banks of the Upper Clarence River, and in which they were breeding. Their cheerful and decidedly musical notes resembling those of the Reed Warbler (*Acrocephalus australis*) were heard, but with few intervals, throughout the day, from early morning until after sunset. In the neighbourhood of Sydney, it may be regarded as a comparatively rare species. Although I have seen them, and heard their merry notes poured forth while engaged in their search for food in the leafy sprays of a *Eucalyptus* in my garden at Ashfield, during August and September, I have never found or heard of any one finding the nest of this species in the vicinity of the city. The birds are more often met with on the southern shores of Botany Bay and at the National Park.

Mr. G. A. Keartland who obtained this species both in Central and North-western Australia writes me:—"Among the scrub which clothes the sides of the rocky gullies in the west Macdonnell Ranges in Central Australia *Stigmatops ocellaris* makes its presence known long before it is seen. It has a rich loud song which is heard to advantage in the narrow deep gullies it frequents. Usually it is met with singly or in pairs; when two of the same sex meet a chase or fight ensues. At Derby, North-western Australia, it is very plentiful during the autumn when the *Melaleuca* trees are in blossom."

While resident at Point Cloates, North-western Australia, Mr. Tom Carter wrote me as follows:—"The active little songster *Glycyphila ocellaris* may be heard almost any season of the year in the deep scrubby gullies on the ranges inland. It may also occasionally be seen or heard in the thickets on the coast sand hills. The nest is generally well concealed and built in some dense creeper or bush overhanging a gully."

Mr. Edwin Ashby who kindly sent me two specimens for examination, obtained by him in Western Australia, writes:—"I first met with *Glycyphila ocellaris*, in May 1889, at York, about one hundred miles due west of Perth. In August 1901, I found it at Callion, seventy miles north of Coolgardie, and in the same month it appeared to be numerous in the neighbourhood of Perth."

* Gould, Proc. Zool. Soc., 1837, p. 154

† Gould, Bds. Austr. fol. ed., Vol. IV., p. opp. pl. 31, (1848).

Mr. A. F. Smith writes me from Cairns, North-eastern Queensland:—" *Glycyphila ocellaris* is plentiful about Hambledon Mill, judging by the amount of singing to be heard in the forest country. At Ingham on the Herbert River, I found a nest with two fresh eggs on the 28th June, 1903."

The first nest and several sets of eggs of this species, I received from the late Mr. George Barnard of Coomooboolaroo, Duaringa, Dawson River, Queensland. A nest taken by him on the 11th September, 1888, was attached to the thin horizontal twigs of an orange tree in his garden, and was built within a few feet from the ground. It is a neat cup-shaped structure, outwardly composed of strips of bark and grasses held together with webs and egg-bags of spiders, the inside being lined with finer grasses, cow-hair, and at the bottom with white downy seeds. Externally it measures two inches in diameter by one inch and a half in depth; the inner cup measuring one inch and a half in diameter by one inch and a quarter in depth.



NEST AND EGGS OF THE BROWN HONEY-EATER

The nest figured, reproduced from a photograph, taken by Mr. George Savidge, was built in a Red Bottle-brush (*Callistemon lanceolatus*) overhanging the Upper Clarence River at Copmanhurst. It is attached by the rim to the leafy extremities of a thin forked horizontal branch, and is externally formed of plant-down, egg-bags of spiders, cobwebs and a little wool all matted up together, the inside being lined entirely with a thick felting of white downy seeds. Externally it measures three inches in diameter by one inch and three-quarters in depth, the inner cup measuring two inches in diameter by one inch and a half in depth. It contained two eggs.

Relative to this species in the Upper Clarence River District, New South Wales, Mr. George Savidge writes me:—"I have never seen *Stigmatops ocellaris* away from watercourses and the riverbed shingles, and it has a very loud and pleasing note for so small a bird. The nest is usually built in the Water Gums, and sometimes in a branch overhanging the water, the site varying from an altitude of three to twenty feet. The eggs are sometimes pure white, and are usually laid from August to the end of October, but I found one nest with fresh eggs in the early days of January."

The eggs are two in number for a sitting, rounded oval in form, the shell being close-grained and lustreless. They are white, and finely freckled or peppered, particularly on the larger end, with almost invisible markings of faint reddish or chestnut-brown. A set of two taken by Mr. H. G. Barnard at Coomooboolaroo, Duaringa, Queensland, on the 26th July, 1892, measures:—Length (A) 0·66 × 0·55 inches; (B) 0·66 × 0·53 inches. A set of two in the Australian Museum collection taken by Mr. George Savidge on the Upper Clarence River, near Copmanhurst, are dull white, slightly nest-stained on one side, but are entirely devoid of markings. Length (A) 0·7 × 0·51 inches; (B) 0·71 × 0·51 inches.

A set of two eggs taken near the Daly River, in January 1901, in the Northern Territory of South Australia, are indistinguishable from specimens taken in Queensland and New South Wales. Length (A) 0·67 × 0·52 inches; (B) 0·65 × 0·53 inches.

Gould's brief original description of *Stigmatops subocularis* in the Proceedings of the Zoological Society of London,^{*} is as follows:—"A species from New South Wales, which differs from *Glycyphila* (*Stigmatops*) *ocularis* in being smaller, and in its more olive colouring." In his "Hand-book to the Birds of Australia"[†] he slightly enlarges on this description, where he remarks:—" *Stigmatops subocularis* is a smaller bird than *S. ocularis*, and consequently one of the most diminutive of the Meliphagidæ; besides differing in size, a yellower tint pervades the entire plumage, and the little spangle like feathers behind the eye are scarcely observable, in all other respects the two birds are very similar. The *S. subocularis* was shot on the north-west coast."

Authorities are divided in reference to *Stigmatops subocularis*. In the "Catalogue of Birds in the British Museum," Dr. H. Gadow regards it a smaller race of *S. ocularis*, and remarks:—"Intermediate forms, however, frequently occur." In the Report of the Voyage of H.M.S. "Alert,"[‡] Dr. R. B. Sharpe refers an example collected on Percy Island to *Stigmatops ocularis*, and another obtained at Port Darwin to *S. subocularis*. While three specimens procured by Dr. L. Loria in the latter locality Count Salvadori regards as *S. ocularis*.

An examination of a larger series of specimens has strengthened the opinion formed in 1898 when I gave a list of the birds collected by the Calvert Exploring Expedition in North-western Australia,[§] part of which is here transcribed:—" *Stigmatops ocularis*—One adult male and one young male obtained near Derby. The adult male has a bleached appearance and the head is more greyish than examples from Eastern Australia. A specimen from the same locality obtained by Mr. E. J. Cairn in 1886, cannot be distinguished from birds procured near Sydney. The young male has the cheeks, upper wing-coverts and edge of the wing distinctly washed with yellow, and is similar in colour and size to young examples from Port Essington, the Gulf of Carpentaria, and Burwood near Sydney. This is Gould's *S. subocularis*, separated by him from *S. ocularis*, on account of its smaller size, and the yellow tint which pervades the plumage. I would point out, however, that a yellow wash to some of the feathers of several species of the Meliphagidæ is a certain indication of youth, and that it is entirely lost when the birds have attained their full adult livery. This may be more particularly observed in *Philemon citreogularis*, *P. sordidus*, *Myzomela pectoralis*, *Glycyphila fulvifrons* and *Stigmatops ocularis*."

The specimens collected by Mr. G. A. Keartland near Derby, have again been kindly sent me for examination by the Trustees of the South Australian Museum, Adelaide. The wing-measurement of the adult male is 2·7 inches; of the young male 2·34 inches. All the young birds of *Stigmatops ocularis* whether from Northern, Eastern, or Western Australia, now before me are more or less tinged with yellow, especially on the cheeks, upper wing-coverts and edge of the wing, and moreover have the dried skin of the gape yellow, another sure indication of immaturity. Two specimens in the Australian Museum collection obtained by Mr. K. Broadbent, at the Gulf of Carpentaria, a young one with the yellow tinted plumage and yellow gape is labelled *S. subocularis*, the other an adult specimen, *S. ocularis*. That as a rule many species are typically smaller and more bleached in appearance when inhabiting the hot and arid regions or Northern and North-western Australia, no one can deny, but on the other hand, with the present species, after allowing for individual variation, there is no greater difference in specimens obtained in widely separated

* Proc. Zool. Soc., 1837, p. 154.

† Gould, Handbk Bds. Austr., Vol. I, p. 502 (1805)

‡ Voy. H. M. S. Alert, p. 18 (1884).

§ Ann. Mus. Civ. Gen., Vol. 29, p. 502 (1890.)

§ Trans. Roy. Soc., S. A., Vol. XXII., p. 147 (1898)

parts of Australia than one could expect to find in a species with a range extending to opposite sides of the continent.

Dr. Ernst Hartert, writing in "Novitates Zoologicae,"* in January 1905, on "A list of Birds collected in North-western Australia, and Arnhem Land" refers all the specimens procured to *Stigmatops ocellaris*, and remarks:—"I am perfectly convinced that "*subocularis*," about which Gould himself was always uncertain is based on young *S. ocellaris*."

Genus ENTOMOPHILA, Gould.

Entomophila picta.

PAINTED HONEY-EATER.

Entomophila picta, Gould, Proc. Zool. Soc., 1837, p. 154; *id.*, Bds. Austr., fol., Vol. IV., pl. 50 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 530 (1865); Gadaw, Cat. Bds. Brit. Mus., Vol. IX., p. 219 (1884); North, Vic. Nat., Vol. XVII., p. 127, (1900).

ADULT MALE—General colour above including the head, cheeks, ear-coverts and sides of the neck brownish-black; behind the ear-coverts a small white spot; upper wing-coverts brownish-black, the greater series narrowly edged with yellow; quills brownish-black broadly margined on their outer webs with bright yellow, and decreasing in extent towards the outermost primary on either side, which is entirely blackish-brown; tail feathers brownish-black, externally margined on their outer webs with bright yellow, all but the central pair having a spot of white at the tip of their inner web, increasing in size towards the outermost feathers on either side which have almost the apical half of the inner web white, and their outer webs entirely brownish-black; a small spot on the chin blackish-brown; remainder of the under surface pure white; the fore neck and breast with small and short longitudinal central streaks of brownish-black, which are larger on the lower flanks; under tail-coverts pure white; bill purplish-flesh colour at the base passing into fleshy-brown at the tip, the upper mandible paler; legs and feet dark grey; iris dark hazel. Total length in the flesh 6.3 inches, wing 3.5, tail 2.2, bill 0.55, tarsus 0.7.

ADULT FEMALE—Resembles the adult male, but is slightly smaller, and has the head, upper parts and wings smoky-black instead of brownish-black. Wing 3.4 inches.

Distribution—New South Wales, Victoria.

THE Painted Honey-eater, one of the most beautiful and undoubtedly one of the rarest species of the family *Meliphagidae* inhabiting Australia, is strictly confined to the south-eastern portions of the continent. In addition to its scarcity it is nomadic in habits, all the specimens I have seen in New South Wales, being obtained in districts where it has only made its appearance during one season, and up to the present time has not been seen again. Writing me in 1905, Mr. E. H. Lane remarks:—"I never saw but one example of *Entomophila picta* during my many years residence in the State, and that one was shot by my nephew in October 1892, on Wambangalang Station near Dubbo. Though he had previously watched it for hours till it went to roost at dusk, he did not find any nest, or notice a second bird." This specimen which was sent me for identification, and is now in the Australian Museum collection, although apparently adult, has the lores, ear-coverts and cheek on one side of the head only, rich dark brown. Wing 3.45 inches. Another male in the collection, received in the flesh on the 11th October, 1897, and shot the previous day by Mr. A. E. Hays of Stony Batter, Uralla, has the entire under surface pure white with a few indistinct flecks of blackish-brown on the flanks only.

* Nov. Zool., Vol. XII., p. 234 (1905).

Wing 3·2 inches. This was the only bird of this species he had ever seen. The wing-measurements of two mounted adult specimens in the Old Collection are respectively 3·2 inches and 3·5 inches. Both have the white under surface almost devoid of the small blackish-brown markings.

In December 1899 this species made its appearance at White Rock near Bathurst, and Dr. G. Hurst obtained its nest and eggs, presenting the former to the Trustees of the Australian Museum, and subsequently sending me the latter as well as a pair of skins on loan for examination. The adult male is similar to the one described above; but has only a few short blackish streaks on the breast. Wing 3·6 inches. The female is smaller and has the white under surface more flecked or streaked with blackish-brown than the male. Wing 3·6 inches. In February 1901, this rare wanderer visited and nested near Sydney, a nest with two fresh eggs being taken at Fivedock on the 14th February, and the parent bird procured. A week later Mr. R. Grant shot an adult male in the adjoining suburb of Abbotsford, and brought back with him an unfinished nest which had been pointed out to him by a boy. It consisted of a few thin strips of red-stringy bark and bark fibre, and was built in the drooping leafy twigs of a *Eucalyptus* at a height of ten feet from the ground. The bird, an adult male, although breeding was in the moult, the greater series of the upper wing-coverts being distinctly tipped with white, and the new secondaries edged around their tips with white: all the tail-feathers, except two new ones are abraded and worn away around their tips. The stomach of this specimen contained the remains of insects, apparently those of small black beetles.

The nest procured on the 23rd December, 1899, by Dr. George Hurst, at White Rock, near Bathurst, is one of the most flimsy specimens of bird architecture I have seen. It is cup-shaped and formed almost entirely of fine yellowish-brown fibrous rootlets, with a very slight addition of spider's web. The sides of it are attached to the thin drooping thread-like leaves of a *Casuarina*, and it is so loosely constructed that daylight is as easily seen through it as the inter-spaces of the surrounding leaves. Externally it measures two inches and a half in diameter by two inches in depth, the inner cup measuring two inches in diameter by one inch and three-quarters in depth. The nest was built in a tree on a bank of the Macquarie River, at a height of thirty feet from the ground, and contained two eggs one slightly incubated, the other addled.

The eggs are oval in form and somewhat compressed towards the smaller end, the shell being close grained and its surface smooth and almost lustreless. The ground colour is a pale salmon-red which is thickly freckled and spotted with darker shades of red. In one specimen the ground colour is slightly darker, and the markings larger and confluent, forming a broken zone, a few large spots also being intermingled with the smaller ones on the thinner end. On the other specimen the markings are slightly larger on the thicker end, where also a few obsolete spots of dull violet-grey are visible. Length (A) 0·78 × 0·59 inches; (B) 0·77 × 0·57 inches. These eggs resemble in colour a variety of those of the Yellow-faced Honey-eater, *Ptilotis chrysope*, Latham. Dr. Hurst had never observed the Painted Honey-eater in the Bathurst District prior to finding the above described nest and eggs. This pair of birds built another nest in the drooping leaves of the limb above in the same tree, from which Mr. S. Robinson took a set of two eggs early in the following January.

Gould found a nest with two nearly fledged young on the 5th September, but judging by the dates quoted, (23rd December and 14th February) the Painted Honey-eater is apparently a late breeder in the normal nesting season of our Australian birds.

Entomophila rufigularis.

RED-THROATED HONEY-EATER.

Entomophila rufogularis, Gould, Proc. Zool. Soc., 1842, p. 137; *id.*, Bds Austr., fol., Vol. IV., pl. 52 (1848).

Conopophila rufigularis, Gould, Handbk. Bds Austr., Vol. I., p. 533 (1865).

Entomophila rufigularis, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 219 (1884).

ADULT MALE—*General colour above brown, wings brown, the outer series of the greater wing-coverts narrowly edged with yellow, the quills of a darker brown than the back and margined externally with yellow decreasing in extent towards the outermost primary on either side, which has the outer web entirely brown; tail feathers brown, with paler margins around the tips and narrowly edged externally with yellow; crown and sides of the head brown like the back; cheeks and sides of the throat grey; chin and centre of the throat rust-red; fore neck and breast pale creamy-brown; centre of the lower breast, abdomen and under tail-coverts white with a faint creamy-brown tinge. Total length 4.8 inches, wing 2.8, tail 2.1, bill 0.42, tarsus 0.6.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, North Queensland.

THE range of the Red-throated Honey-eater extends right across the northern portion of the Australian continent. I have specimens now before me collected by Mr. E. J. Cairn, near Derby, and by Mr. G. A. Kearland near the junction of the Fitzroy and Margaret Rivers in North-western Australia, by Mr. Alex. Morton at Yam Creek, near Port Essington in the Northern Territory of South Australia, others from the Flinders River and the southern shores of the Gulf of Carpentaria, procured by the late Captain Armit and Mr. K. Broadbent, and a specimen from Cairns on the north-eastern coast of Queensland, presented by Mr. A. F. Smith who writes me:—"At Ingham on the Herbert River, I found a nest of *Entomophila rufigularis* on the 21st December, 1901. The nest was suspended from the end of a leafy branch of a small sapling, about five feet from the ground and fifty yards from a creek; it contained a set of three fresh eggs. I have always found this species in the near vicinity of water."

Dr. W. Macgillivray sends me the following note:—" *Entomophila rufigularis* is fairly common at Cloncurry, in the Burke District, two hundred miles south from the Gulf of Carpentaria, Queensland, and seems to feed mostly in the tea-trees along the creeks. The nest is usually placed in a prickly acacia or other low bush at no great distance from the ground. They nest in the wet season."

Mr. G. A. Kearland who procured five specimens and also obtained many nests and sets of eggs of this species, writes me as follows:—"Along the course of the Fitzroy and Margaret Rivers in North-western Australia, I found Red-throated Honey-eaters very common during the latter part of 1896 and the early months of 1897; generally they are scattered about singly or in pairs. They drink frequently and are seldom very far from water. Whether searching for insects among the long grass, or flitting from branch to branch in the small black fig trees, upon the fruit of which they feed, they keep up an incessant chatter. If one pair intrude on the domain of another a pitched battle ensues, I have also seen them attack Sordid Friar-birds and drive them away. The same chattering note is continued at intervals during nest building operations, at which time they seem quite regardless of the presence of man. On several occasions building was continued while I stood only a few feet away from the structure on which they were engaged. The nests are suspended by one side to the drooping leafy twigs of a

Bauhinia or *Eucalyptus* at an altitude of about six feet, but one nest near our camp was fully twenty feet from the ground. Two or three eggs are laid for a sitting, and the breeding season commences immediately after rain in January or February. The sexes can only be distinguished by dissection and the rusty-brown on the throat of the adult is absent in the young. I saw two young birds near Mr. Harris' house without any indication of the rusty-brown patch on the throat, although their parents were of the usual type."

A nest taken by Mr. Keartland near the Fitzroy River in February 1897, is attached on one side to a thin leafy twig of a species of *Bauhinia*. It is a deep cup-shaped structure, one side of it being considerably higher than the other, and is outwardly formed of very fine bark fibre, a small quantity of grass, and the outer covering of some composite plant, firmly matted and held together, the inside being neatly lined with fine dried grasses. On one side it measures externally four inches and a quarter in depth, on the other two-inches and a half; inside diameter two inches.

The eggs are two or three in number for a sitting and are extremely variable in size, shape, disposition and colour of their markings. The most common type is elongate oval in form, white, with small irregular-shaped spots and dots of rich red or pinkish-red evenly distributed over the entire surface of the shell, and closely resembles the eggs of *Gerygone albigularis* or *Malurus australis*. Two sets of three measure as follows:—Length (A) 0·74 × 0·5 inches; (B) 0·76 × 0·51 inches; (C) 0·73 × 0·5 inches; (D) 0·77 × 0·5 inches; (E) 0·78 × 0·53 inches; (F) 0·73 × 0·5 inches. A set of two are nearly round, and measure:—Length 0·63 × 0·53 inch; (B) 0·67 × 0·55 inch. Another type has a zone on the larger end formed of large confluent dull red blotches, and resembles some varieties of the eggs of *Malurus lamberti* or *M. australis*. A third has the pure white ground colour sparingly spotted and dotted with purplish-black, and in some specimens a few large penumbral markings of purplish-red on the thicker ends, and resembles the eggs of *Glycyphila modesta* or *Ephthianura albigrons*. A set of two measures:—Length (A) 0·68 × 0·48 inches; (B) 0·67 × 0·47 inches.

A young female in the Australian Museum collection procured by the late Mr. T. H. Bowyer-Bower, near Derby in 1886, resembles the adult, but is paler on the upper parts, the greater wing-coverts are more strongly washed with yellow, the throat is dull white, the creamy-brown breast band is very pale, and the basal half of the lower mandible is light brown. Wing 2·55 inches.

The wing-measurement of adult males vary from 2·8 to 3 inches.

Entomophila albigularis.

WHITE-THROATED HONEY-EATER.

Entomophila ? albigularis, Gould, Proc. Zool. Soc., 1842, p. 137; *id.*, Bds. Austr., fol., Vol. IV., pl. 51 (1848).

Conomophila albigularis, Gould, Handbk. Bds. Aust. Vol. I., p. 532 (1865); Salvad., Orn. Pap. et Molucc., Pt. II., p. 309 (1881).

Entomophila albigularis, Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 219 (1884) (*part*).

ADULT MALE.—Differs from the adult male of *ENTOMOPHILA RUFIGULARIS*, in having the forehead, crown and sides of the head, cheeks, and ear-coverts ash-grey; the chin and center of the throat pure white; the fore neck and upper breast rufous-brown, becoming much paler on the sides of the body; center of the lower breast, abdomen and under tail-coverts white faintly tinged with creamy-brown; bill blackish-grey; legs and feet bluish-grey iris bright reddish-brown." (Gould). Total length 4·6 inches, wing 2·55, tail 1·8, bill 0·55, tarsus 0·7.

ADULT FEMALE.—Similar in plumage to the male.

Distribution—Northern Territory of South Australia, New Guinea, Aru Islands.

THE range of the White-throated Honey-eater on the Australian continent is more restricted than that of the preceding species. In addition to the characters pointed out *Entomophila albigularis* may be distinguished from *E. rufigularis* by its larger bill. Gilbert remarks,* "I first met with it on Mayday Island in Van Diemen's Gulf, where it appeared to be tolerably abundant; I afterwards found it to be equally numerous in a large mangrove swamp near Point Smith. It is an extremely active little bird, constantly flitting from branch to branch and taking irregular flights, during which it utters its pretty song; it also pours forth its agreeable melody for a length of time without intermission while sitting on the topmost branches of the trees." Mayday Island in Van Diemen's Gulf is in the Northern Territory of South Australia, and less than twenty miles distant from Yam Creek, near Port Essington, where Mr. Alex. Morton obtained specimens of *Entomophila rufigularis*, but did not meet with the present species. The late Mr. Edward Spalding observed *E. albigularis* near Port Darwin, and nests and sets of eggs of this species were received by the Trustees of the Australian Museum, taken on the Daly River. Mr. C. French, Junr., also kindly forwarded me eggs for examination, and presented nests and mutilated skins from the same locality.

Recently Dr. E. Hartert has recorded† *E. albigularis* from the Alligator River, and *E. rufigularis* from the South Alligator River, one hundred miles from the coast. Although *E. albigularis* may occur in the coastal districts of the adjoining portion of North-western Australia, I have never seen a properly authenticated specimen from this part of the continent. The specimen referred by Dr. E. P. Ramsay‡ from Derby, North-west Australia, to *E. albigularis*, which I have now before me, is unquestionably the young of *E. rufigularis*, which he correctly described in a former volume of the "Proceedings of the Linnean Society New South Wales."|| Dr. H. Gadow's description of a young bird of *E. albigularis* in the "Catalogue of Birds in the British Museum,"§ in his list of specimens examined, stated to be obtained by Elsey in North-western Australia, also applies to the young of *E. rufigularis* and not that of the present species, for even in the fledgeling of *E. albigularis* the feathers on the forehead are distinctly shaded with ashy-grey, and the rufous-brown collar on the fore neck quite pronounced.

Four nests of *E. albigularis* now before me, taken from branches of trees overhanging the banks of the Daly River in the Northern Territory of South Australia are all deep purse-shaped structures slung by the rim to the junction of a thin leafy horizontal fork, where they are all higher than the side between the widest portion of the fork. Outwardly they are formed of bark fibre, plant down and spiders' webs firmly felted together, the inside and bottom of the structure being globular in form and lined with fine wiry dried grasses and bark fibre. An average one measures externally at the rim, where it is contracted, one inch and three-quarters, its greatest diameter two inches and a quarter. From the junction of the fork to the bottom of the structure three inches and a half; on the lower side two inches and a half. Internal measurements at rim one inch and a quarter, depth two inches and a quarter.

Of many sets of eggs examined three is the usual number for a sitting, but there is one set of four in the Australian Museum collection. The eggs are oval in form, the shell being close grained and lustreless, with minute dots and fine freckles of light red thickly distributed over the shell, but predominating as usual on the thicker end, where in some instances they form a well defined cap or zone, and resemble more closely the eggs of some species of *Malurus*. A set of three in the Australian Museum collection taken on the Daly River in the Northern Territory of South Australia, on the 14th January, 1902, measure as follows:—Length (A) 0.69 × 0.5 inches; (B) 0.72 × 0.51 inches; (C) 0.72 × 0.49 inches. A set of four taken in the same locality

* Gould, Handbk. Bds. Austr., Vol. I., p. 532 (1865).

† Nov. Zool., Vol. XII, p. 234-5 (1905).

‡ Proc. Linn. Soc. N. S. Wales, Vol. I., (2nd ser.), p. 1098, (1886).

§ Proc. Linn. Soc. N. S. Wales, Vol. II., p. 111 (1877).

¶ Cat. Bds. Brit. Mus., Vol. IX., p. 220 (1884).

on the 29th January, 1902, measures:—Length (A) 0·67 × 0·52 inches; (B) 0·64 × 0·49 inches; (C) 0·64 × 0·5 inches; (D) 0·67 × 0·52 inches.

A mutilated skin of a fledgeling, with the tail feathers missing, presented by Mr. Charles French, Junr., resembles the adult but has the upper wing-coverts margined with yellow, the feathers on the forehead only are shaded with ashy-grey, and the rufous-brown collar on the under surface, although well pronounced, is narrower, and does not extend lower down than the fore neck; bill fleshy-brown; gape yellow. Wing 1·6 inches.

The breeding season of this species in the Northern Territory of South Australia is during the early parts of the year, the nests described being taken in January and February, 1902.

Genus **CERTHIONYX**, Lesson.

Certhionyx variegatus.

PIED HONEY-EATER.

Certhionyx variegatus, Lesson, 'Traité d' Orn., p. 306 (1831).

Melicophila picata, Gould, Bds. Austr., fol., Vol. IV., pl. 49 (1848).

Lichnotentha picata, Gould, Handbk. Bds. Austr., Vol. I., p. 529 (1865).

Entomophila leucomelas, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 220 (1884).

ADULT MALE—*General colour above black; rump and upper tail-coverts white, the inner webs of some of the longer coverts black; scapulars, the inner and outer series of the upper wing-coverts black, the central coverts pure white; quills dark brown, gradually passing into black on the innermost secondaries which are margined on their outer webs and tips with white; central pair of tail feathers brownish-black, the remainder white with a broad terminal band of brownish-black; head, all round sides of neck and throat black; remainder of the under surface and under tail-coverts pure white; bill bluish-grey, blackish at the tip; legs and feet bluish-black; iris dark brown; fleshy appendage beneath the eye bright sky-blue* (Bennett). *Total length 6·5 inches, wing 3·4, tail 2·8, bill 0·7, tarsus 0·8.*

ADULT FEMALE—*General colour above light brown, some of the feathers on the back with darker centres; wings brown, the central series of the median and greater wing-coverts margined with dull white; some of the inner secondaries margined externally with white-brown which passes into almost a pure white around their tips; tail-feathers brown with narrow light brown margins; head and sides of the neck like the back; under surface faint buffy-white passing into a creamy-white on the centre of the upper throat, the lower throat and fore neck of a pronounced buffy hue, the centres of most of the feathers dark brown; under tail-coverts faint buffy-white, some of the longer ones with a central streak of brown.*

Distribution—New South Wales, South Australia, Central Australia, Western Australia, North-western Australia.

THE present species was originally described by Lesson in his "Traité d' Ornithologie" in 1831, and upon the authority of Lesueur, its habitat is erroneously recorded as Timor. From the reference given by Lesson, *Certhia leucomelas* is apparently based only on a name given by Cuvier in the Paris Museum. Under the name of *Melicophila picata*, Gould accurately described and beautifully figured it in his folio edition of the "Birds of Australia." In the "Catalogue of Birds in the British Museum,"† where this species is described under the name of *Entomophila leucomelas*, an evident *lapsus calami* occurs, in referring to the adult male as having the "centre pair of tail feathers and terminal quarter of the others pure white," instead of brownish-black.

* Gould, Bds. Austr., fol. ed., Vol. IV., pl. 49, (1848).

† Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 220 (1884).

The Pied Honey-eater, as it is commonly called, is widely distributed, principally over the southern half of the Australian Continent. There are specimens in the Australian Museum obtained by the late Mr. K. H. Bennett, in the Lachlan River and the Mossgiel Districts, New South Wales, also an adult male from Port Wakefield, South Australia. Specimens have also been kindly lent for examination by the Director of the South Australian Museum, Adelaide; an adult male and female from the Gawler Ranges procured by the late Mr. F. M. Andrews, in September 1883, and a beautiful adult male obtained on the 3rd August, 1900, by Dr. A. M. Morgan, at a place known as The Birthday, about ninety-five miles to the north-west of Port Augusta. Relative to the latter, Dr. Morgan writes me:—"Only one specimen of *Certhionyx leucomelas* was obtained. This bird is of a very retiring habit, and was discovered by its note, which is a mournful whistle, resembling that of *Megalurus gramineus*: no nests were found."

From Port Augusta, South Australia, Dr. A. Chenery writes me:—" *Lichnotentha leucomelas* is rather rare in this district. A nest was taken at Euro Bluff, thirty-eight miles to the north-west, on the 9th September, 1899. It was built in a Wild Currant bush about six feet from the ground and contained three eggs. I have seen birds occasionally since, both in myall country and in mallee."

The following notes were made by the late Mr. K. H. Bennett:—"The Pied Honey-eater is a migratory species, arriving in the Mossgiel District, New South Wales, about the beginning of October and departing again at the end of the year. Although somewhat numerous here in good seasons, I have never met with it in flocks, as described by Gilbert in Western Australia. When disturbed I have frequently observed it mount almost perpendicularly to a considerable height before flying off, and it is at all times exceedingly shy. I have occasionally met with this bird in the clumps of timber on the plains, but during its stay here it is usually found in thickly timbered or scrubby country. Besides the pollen or nectar of flowers, its food consists of various small berries."

Mr. G. A. Kearthland writes me:—"Whilst in the Great Desert of North-western Australia with the Calvert Exploring Expedition in September 1896, I shot a great number of Pied Honey-eaters (*Certhionyx leucomelas*) in some open mallee scrub. Several of them, immature males, had a number of brown feathers on the head and back, showing they had not attained their full adult plumage. On the 22nd October, 1896, I discovered a pair of these birds at their nest, which was placed in the fork of a horizontal branch of a cork-bark tree. It was built of short grass stems, bound together with spiders' webs, and contained one fresh egg, similar to those of *Artamus sordidus*. A few days later several flocks of these birds were noticed flying northwards; their flight was like that of the Warty-faced Honey-eater. At the Fitzroy River I met with this species again, but they were either flying too high, or were so wary I did not procure any specimens. In 1895 I received several sets of their eggs taken by Mr. C. E. Cowle at Illamurra, Central Australia, but at the time was not quite certain as to the identity of them."

While resident at Point Cloates, North-western Australia, Mr. Tom Carter wrote me as follows:—"The Pied Honey-eater is one of the commonest winter visitors, occurring in great numbers immediately after the first heavy rain. Odd birds may also be seen in summer, but usually immature birds in the dull plumage of the female. Perched on the top of a low bush the male utters a rather melancholy piping note: sometimes flying up in the air and singing as it descends, with outspread tail-feathers to rest on another bush. They chiefly frequent thick scrub on the coast sand-hills. Their nests are well made structures, and generally about four or five feet from the ground. I have taken nests with egg or young between 27th June and the 24th July, in different seasons. Three eggs is the usual number laid. The female occasionally feigns lameness or a broken wing if disturbed off a nest containing young."

Mr. C. G. Gibson has kindly sent me the following notes:—"At Lake Austin on the Murchison Goldfields, Western Australia, I found several nests of *Certhionyx leucomelas*, in August and September 1903. On the 2nd September, one built in a low bush contained two fresh eggs; of two nests I found on the 5th September, one contained three, the other four fresh eggs. In the Erliston District in 1905, these birds made their appearance about the middle of July, and began nest building almost at once. On the 14th August, I found a nest in a mulga with three eggs much incubated, and another built on the top of thick creepers on a mulga five feet from the ground, from which I took three eggs four days later. On the 17th August I found a nest three feet up in a sandal-wood with two fresh eggs, and another on the following day in the thin twigs at the end of a branch of spiny mulga, containing two fresh eggs. Both sexes assist in constructing the nest, and the male appears to take as much part in the incubation of the eggs as the female. Frequently I have flushed the cock bird from the nest, even while sitting on fresh eggs."



NESTS AND EGGS OF THE PIED HONEY-EATER.

Three nests of this species taken by Mr. C. G. Gibson, in August 1905 at Laverton, Western Australia, are open deep saucer-shaped structures irregularly formed externally of long thin twigs, dead grey grasses and small dried flowering plant stalks. They vary in size, the one here figured being the largest, owing to the greater number of twigs used in its outer

construction, the lining too is somewhat different, consisting of pieces of salt-bush stalks, and fine brown cane-like grass. Excluding straggling twigs it averages externally five inches in diameter by two inches in depth, and the saucer-like depression in the centre three inches in diameter by one inch in depth. The smallest nest measures externally only three inches and a quarter in diameter. The nests are placed at the junction of several thin horizontal leafy stems of a bush or tree, one now before me is placed on and between a four pronged stem of a long narrow-leaved shrub, one on either side and two beneath the structure, and is also partially supported, and in a measure concealed by its long narrow leaves somewhat resembling the twigs of which the outer portion of the nest is formed.

From the preceding notes it will be found that June and the five following months constitute the usual breeding season of this species, nests with eggs being more frequently found in August and September. In Central Australia Mr. C. E. Cowle has taken fresh eggs in March, the breeding season of many species there, as in Northern Australia, usually following after heavy rains in the early part of the year.

Dr. E. P. Ramsay inadvertently described the eggs of another bird as those of *Certhionyx variegatus*.¹ The late Mr. K. H. Bennett informed me shortly before his decease that the former eggs belonged to an undescribed species of Honey-eater resembling *Certhionyx variegatus*, which

¹ Proc. Linn Soc. N.S.W., Vol. VII, p. 414 (1883)

appeared in great numbers one season and were never seen by him again. These eggs are oval in form, smooth shelled and lustrous, of a beautiful greenish-blue ground colour, and have irregular shaped spots and blotches of rich red on the larger end, intermingled with very faint yellowish-red patches on one specimen which also has the predominant markings much larger and darker. Both eggs are unlike those of any Honey-eater or other Australian bird. Length (A) 0.82 × 0.6 inches; (B) 0.82 × 0.62 inches. In his notes made in the Mossiel District, prior to his taking properly authenticated eggs of *Certhionyx variegatus*, Mr. Bennett wrote as follows:—"I have never been able to satisfy myself as to the nidification of the Pied Honey-eater, but a nest I found in the scrubby country to the north of this place a few years ago I believed to belong to this species. The nest was an exceedingly neat and beautiful structure, much resembling that of *Sauoleprocta motacilloides*, but smaller, and placed on a forked horizontal branch about three feet from the ground; it contained two eggs of a blue ground colour. Having caught only a glimpse of the bird as it left the nest, and never having seen any eggs like them previously, I withdrew and watched for some considerable time, but the bird did not return, and as I had many miles to travel before reaching home, I reluctantly took the eggs." It has been suggested that the eggs are those of the Pied Robin, but it is hardly likely that Mr. Bennett with his quarter of a century experience of this common species which is found in the district could make a mistake of this kind, and he always maintained that they belonged to an undescribed species. Having the specimens before me I can state most emphatically that they are not the eggs of the Pied Robin, and for the purpose of distinguishing them, in the Australian Museum collection, I have labelled them as the eggs of "Bennett's Honey-eater."

The eggs of the present species are usually three, sometimes only two, and rarely four for a sitting. They vary from oval to rounded and elongate oval, the shell being close grained, smooth and usually lustreless, but one set now before me has a slight gloss. Typically the ground colour is either dull white, dull greyish-white or faint creamy-white, over which is evenly distributed freckles and spots of blackish-brown, with which are intermingled similar underlying markings of dull bluish-grey, particularly towards the larger end. In some specimens the markings are rounded in form; in others of irregular shape especially the underlying ones which in rare instances form small confluent irregular shaped patches. There is an unusual set of three in the Australian Museum collection taken by Mr. C. G. Gibson, in August 1903, at Lake Austin, Western Australia, two have the ground colour dull white, the other yellowish-brown, the dots and spots on the former being blackish-brown and dull bluish-grey, while on the latter specimen they are umber-brown and very faint bluish-grey. Length (A) 0.9 × 0.67 inches; (B) 0.88 × 0.67 inches; (C) 0.83 × 0.7 inches. A set of three taken at Island Creek Lagoon, one hundred and thirty miles north-west of Port Augusta, South Australia, measures:—Length (A) 0.93 × 0.65 inches; (B) 0.92 × 0.65 inches; (C) 0.93 × 0.64 inches. A set taken by Mr. C. E. Cowle, at Illamurta, Central Australia, and also one by the late Mr. K. H. Bennett, in Western New South Wales, are slightly smaller in their measurements. The eggs of this species resemble some varieties of those of the Dusky Wood-Swallow, *Artamus sordidus*.

There is a young male in the Australian Museum Collection procured by Mr. K. H. Bennett and labelled "Lachlan River, New South Wales, rare, 10th January, 1881, bill brown, base of under mandible and the gape yellow; legs and feet bluish; iris brown; sex male." It is indistinguishable from the adult female, except in having the feathers on the fore neck and upper breast more distinctly centred with brownish-black. Wing 3.1 inches.

Genus MYZOMELA. Vigors and Horsfield.

Myzomela sanguinolenta.

SANGUINEOUS HONEY-EATER.

Certhia sanguinolenta, Lath. Ind. Orn., Suppl. p. xxxvii., (1801).*Myzomela sanguinolenta*, Gould, Bds. Aust. fol. Vol. IV., pl. 63 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 555 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 131 (1884).

ADULT MALE—Mantle, back, rump, and upper tail-coverts black, their central feathers largely tipped with rich scarlet, forming an irregular and broken marking down the middle of the upper parts; upper wing-coverts black, the outer webs and tips of the greater series having narrow whitish edges; quills black, narrowly edged externally with dull olive-white; tail feathers black; lores black; head and neck all round rich scarlet; remainder of the under surface dingy-grey with a yellowish wash, which is more pronounced on the centre of the abdomen; tips of the feathers on the fore neck and chest and many of them on the breast, scarlet, on the latter part the dull basal portion of the feathers are visible, giving it a mottled appearance; under tail-coverts dull white with pale greyish-brown centres; bill black; legs and feet black with a slight olive tinge; iris black. Total length in the flesh 4·5 inches, wing 2·3, tail 1·5, bill 0·5, tarsus 0·55.

ADULT FEMALE—General colour above brown slightly tinged with olive, the rump and upper tail-coverts washed with rufescent-olive; wings brown and similarly marked as in the male; tail-feathers brown, with very narrow lighter margins; lores, forehead, crown of the head, nape and hind neck like the back; chin, throat and ear-coverts whitish-brown, the tips of most of the feathers slightly darker, the base of the ear-coverts and a few scattered feathers on the chin and upper throat dull scarlet; the under surface dull brownish-white becoming a clearer white on the centre of the abdomen and under tail-coverts.

Distribution—Queensland, New South Wales, Victoria.

THE Sanguineous Honey-eater or "Blood-bird," as it is called throughout Eastern New South Wales is widely distributed over the coastal districts of Eastern Australia. Mr. Frank Hislop has found it breeding in the Bloomfield River District, North-eastern Queensland, Messrs. E. J. Cairn and Robt. Grant obtained specimens while collecting on behalf of the Trustees of the Australian Museum, near Cairns, as also did Mr. George Masters, farther south at Gaydah on the Burnett River. It is usually common in most of the coastal districts of New South Wales, and in some seasons it also occurs in Victoria. I have seen skins of stragglers obtained in the latter State as far south and west as Lorne.

Nowhere is it more abundant in certain seasons of the year than the coastal districts around Sydney. Although fairly regular in its appearance during early spring, it is distinctly nomadic and erratic in habits during the winter months. Close to the coast, between Manly and Narrabeen I have during many seasons usually noted it, and often obtained specimens in June and July, while in the western suburbs of Sydney it does not generally appear until the latter end of August or early in September. During a period of drought, what might be regarded as an irruption of Blood-birds took place in the Sydney coastal districts in May and June 1902. At Middle Harbour, Manly, Bondi, Randwick and Kurnell, they were in hundreds, and by far the greater number being adult males. Mr. H. Newcombe, who presented eight specimens to the Australian Museum, supplied the information, that at Cook's Landing Place, Botany Bay, on the 31st May, some boys had about thirty birds that they had killed with stick and stones. Stragglers were also obtained at Cootamundra and other parts of Eastern New South Wales, where previously it had been unobserved. The early winter months of the following year it was unusually scarce, and only a few pairs were observed between Manly and Kurnell. In May 1904 I saw two females of this species in the Fig-trees of Hyde Park, Sydney. At Roseville it generally appears about the middle of August or early in September, but in 1900 it was unusually late, the first bird, an

adult male, being heard and seen on the 11th November. They became common in December and January but did not breed, the following year they appeared on the 1st September and were very numerous, starting to breed shortly after their arrival. At the latter end of October, they suddenly left Roseville and the contiguous portion of Middle Harbour, abandoning even their fledgelings, several of which I saw in different parts of the bush and one I caught on the 31st October. Probably their departure was due to the high winds which prevailed for several days just at that time. They were not observed again that season in the neighbourhood, which they usually leave about the middle of February.

Except during the breeding season Blood-birds resort chiefly to the taller *Eucalypti*: when the latter are in flower it is a beautiful sight to see the adult males feeding among the white blossom. The stomachs of many specimens examined contained only the remains of small insects.

It is difficult to convey by words any idea of the succession of remarkably sweet and clear notes of the male, which may be heard a considerable distance away. In early spring he utters one of the liveliest strains, and it is just as animated when poured forth during the midday heat of summer when most other species are silent. Once heard it cannot be mistaken for that of any other bird. The notes of the female are somewhat different and they are less prolonged than in the male.

The nest is a small open cup-shaped structure formed of very fine strips of bark or bark-fibre with a slight addition of cobwebs, the inside being slightly lined with finer material, and in some with fine wiry fibrous rootlets. Most of the nests I have found were outwardly constructed with red stringy-bark fibre, and they were so frail that when they contained eggs, the latter were visible when standing beneath the nest. They are attached at the rim to a thin horizontal fork of a tree, often where another thin stem crosses the others forming a triangle, the nest thus being securely fastened at the rim by cobweb in three places. An average nest measures externally two inches in diameter by one inch and a half in depth, the inner cup measuring one inch and a half in diameter by one inch and a quarter in depth. The trees most favoured as nesting sites in the neighbourhood of Sydney are Turpentine-trees, tea-trees, and gum saplings. Some are built in the terminal leafy branchlets, others near the main stem, or a thick branch, at a height varying from three to twenty feet from the ground.

The eggs are almost invariably two, rarely three in number for a sitting, oval or rounded-oval in form, the shell being close grained, smooth and lustreless. The ground colour varies from faint buffy-white to almost a pure white, which is distinctly spotted and blotched with yellowish-brown, and faint purplish, or reddish-brown, the markings predominating, and in some specimens entirely confined to the larger end, where they not infrequently form a more or less well defined zone. A set of two taken at Glenfield, Richmond River, on the 7th November, 1888, measure:—Length (A) 0.65 × 0.48 inches; (B) 0.62 × 0.47 inches. A set of two taken at Roseville, on the 13th October, 1902, measure:—Length (A) 0.62 × 0.49 inches; (B) 0.63 × 0.49 inches. A set of three taken in the Bloomfield River District, North-eastern Queensland, measure:—Length (A) 0.63 × 0.48 inches; (B) 0.62 × 0.46 inches; (C) 0.65 × 0.45 inches. The latter specimen is almost pure white sparingly and very minutely dotted with pale purplish-red.

Young males resemble the adult female, but have the rump and upper tail-coverts ochreous-fulvous, the scarlet feathers first appearing about the chin and sides of the head and down the centre of the back, the black feathers on the sides of the latter appearing about the same time. When the entire head and neck all round is scarlet, there is only indications of the scarlet tips to the feathers of the fore neck and breast. In the Australian Museum collection are males in all stages of plumage, from the young in modest garb to the gorgeously plumaged adult male with its predominant rich scarlet and black livery.

The breeding season commences in August and continues until the end of January. At Chatswood I took a nest with two fresh eggs, on the 16th September, 1901. The nest was built in a gum sapling about eight feet from the ground. The female alone constructed this nest which was commenced on the 7th September, the first egg being deposited eight days later; while examining it the male perched within six inches of my face. The second egg was deposited the following day and the female was disturbed while sitting. While taking the nest the female was feeding in the blossom of a low gum sapling near at hand, and the male was singing in a tall *Eucalyptus*. A week later, I watched for some time the female of presumably the same pair of birds, removing strips of bark from a half formed nest built in a sapling close to the tree in which the nest with eggs was taken. On the 4th October following at Roseville, I saw a female building in a Turpentine tree, the outline of the nest being barely formed. Early on the morning of the 7th October, I saw two females carrying nesting-material in different parts of the bush.



NEST AND EGGS OF THE SANGUINEOUS HONEY-EATER.

One I watched tearing off strips of the soft red inner-bark of an *Angophora intermedia*. Unmindful of my presence only a few yards away it grasped a shred in its bill, firmly grasping the stem with its claws, against which its tail feathers were outspread, it started to tug; the bark yielding, the bird held on with its bill only and rapidly fluttered its wings until the shred was torn off. This it repeated several times, flying with the nesting material noiselessly and rapidly away. Meanwhile the beautiful old

male was engaged in probing the flowers of a low gum sapling close by, after the manner of *Acanthorhynchus tenuirostris*. Poised in the air on outspread wings and with its brilliant scarlet and black back, it looked like a flame of fire as it hovered over each white blossom. Six days later I found the nest and eggs here figured in a low Turpentine tree close by. The nest, which I photographed the following day, contained two fresh eggs, and was about ten feet from the ground. Another nest built in a Turpentine in an adjoining paddock contained two young ones. That season the birds suddenly left the district at the end of October. In Dobroyde garden on the 21st December, 1888, I found two nests, both were built among the rigid spine-like leaves of the acclimatised *Pinus insignis*, and were about four feet from the ground. Each contained two recently hatched young birds. All were, however, dead, probably perished through the extreme heat, for it was a period of drought and high temperatures. At Rope's Creek, about twenty-seven miles west of Sydney, Mr. George Masters informs me that he found five Blood-birds' nests in one day, each containing two fresh eggs. All the nests were formed of the paper-like bark of that tree. At Eastwood Mr. S. W. Moore found a nest with two slightly incubated eggs on the 2nd January, 1893, and another nest apparently nearing completion. On the 21st of January of the same year, and in the same locality he found a nest in which young birds were being fed.

Myzomela erythrocephala.

RED-HEADED HONEY-EATER.

Myzomela erythrocephala, Gould, Proc. Zool. Soc., 1837, p. 144; *id.*, Bds. Austr., fol., Vol. IV., pl. 64 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 556 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 133 (1884); North, Proc. Linn. Soc. N.S.W., Vol. XXII., p. 381, (1898).

ADULT MALE—*General colour above, including the wings and tail blackish-brown, the quills indistinctly edged externally with pale sulphur-olive; lores blackish; head and neck all round, lower back, rump and upper tail-coverts rich scarlet; fore-neck blackish-brown, passing into dull brownish-grey on the remainder of the under surface and under tail-coverts; bill olive-brown, becoming much lighter on the lower mandible; legs and feet olive-grey, iris reddish-brown.*—(Gould). Total length 4.5 inches, wing 2.3, tail 1.7, bill 0.6, tarsus 0.6.

ADULT FEMALE—*General colour above including the wing and tail greyish-brown, with a slight olive tinge on the upper tail-coverts, the outer webs of the quills dull sulphur-olive; the under parts greyish-brown, lighter on the centre of the breast and abdomen; the forehead, chin, upper throat and lower portion of the cheeks washed with scarlet.*

Distribution—Northern Territory of South Australia, Northern Queensland, Islands of Torres Strait, South-eastern New Guinea.

THE Red-headed Honey-eater is an inhabitant of the northern portions of the continent. Collecting on behalf of the Trustees of the Australian Museum, Mr. Alex. Morton procured specimens at Port Essington. During the "Voyage of the Chevert" fitted out by the late Sir William Macleay, six males and two females were obtained at Cape York, six males and one female on Long Island, and one young male on Warrior Island, of which Mr. George Masters writes:—"During the month of June, this pretty species was very numerous about Cape York, where it frequented the high mangroves; it also appeared to be very common throughout the islands in Torres Straits."* Mr. Masters has also enumerated this species in a list of birds obtained by the late Mr. Edward Spalding near Port Darwin. In his original description Gould stated the type was obtained by Mr. Bynoe, and gave the habitat as North-west Australia. In his folio edition of the "Birds of Australia," Gould remarks that all the specimens that had come under his notice were procured at Port Essington. In the Australian Museum collection are two unlocalized specimens, an adult male and young male from Northern Australia.

A nest taken on the 27th September, 1897, is a very small cup-shaped structure suspended by the rim to a thin forked horizontal twig. Outwardly it is formed of very fine strips of bark and bark-fibre, intermingled with a small quantity of cobweb, more especially where the rim of the nest is attached to the fork. Externally it measures two inches in diameter by one inch and a half in depth.

The eggs are two in number for a sitting, oval in form, the shell being close grained, smooth and lustreless. They are pure white, with freckles, irregular-shaped spots and blotches of pale red, unevenly distributed over the larger end, where in one specimen they form an ill-defined zone. Length (A) 0.64 × 0.45 inches; (B) 0.61 × 0.46 inches.

The young male resembles the adult female, but has also some dull scarlet feathers on the crown and nape. Wing 2.15 inches.

* Proc. Linn. Soc. N.S.W., Vol. I., p. 55 (1877).

Myzomela obscura.

DUSKY HONEY-EATER.

Myzomela obscura, Gould, Proc. Zool. Soc., 1842, p. 136; *id.*, Bds. Austr., fol., Vol. IV., pl. 67 (1848); *id.*, Handbk. Bds. Aust. Vol. I., p. 559 (1865); Salvad. Orn. Pap. et Molucc., Pt. II., p. 303 (1881); Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 143 (1884).

ADULT MALE.—General colour above and below, including the head, brown; the under parts paler with a reddish or rufous tinge, which is more pronounced on the lower throat; the quills and tail feathers with a blackish-grey shade, the outer webs of the former with narrow indistinct whitish edges; bill black; legs and feet greyish-black. Total length 5 inches, wing 2½, tail 2½, bill 0·6, tarsus 0·7.

ADULT FEMALE.—Similar in plumage to the male.

Distribution—Northern Territory of South Australia, Queensland, New Guinea, Aru Islands.

THE range of this species extends from the Northern Territory of South Australia along the eastern coast of Queensland, to the islands of Torres Strait, South-eastern New Guinea, and the Aru Islands. Collecting on behalf of the Trustees of the Australian Museum Mr. Geo. Masters procured specimens at Wide Bay, Queensland, in October 1867. Mr. J. A. Boyd found it breeding at Ripple Creek, an affluent of the Herbert River in 1895. Specimens were obtained at Cairns by Mr. K. Broadbent, Messrs. E. J. Cairn and Robert Grant, and Mr. A. F. Smith. Mr. Frank Hislop found it breeding in the Bloomfield River District, and Mr. George Masters procured specimens at Cape York in 1875 during the Voyage of the "Chevert."

From examples obtained at Brock's Creek and other parts of the Northern Territory of South Australia, Dr. E. Hartert has recently characterised a new subspecies under the name of *Myzomela obscura griseescens*.⁶ The greyish shade to the feathers of this form is clearly visible in specimens procured by Mr. A. Morton at Yam Creek, near Port Essington, where the typical form of *Myzomela obscura* is found as described by Gould. The character of Dr. Hartert's subspecies is, however, far more pronounced in a specimen sent for examination by Mr. Edwin Ashby that was obtained at Port Keats, Hyland Bay, and not far distant from the border line of North-western Australia. In a large series of specimens now before me, those from the eastern coast of Queensland and the south-eastern portion of New Guinea, may be distinguished by their dark brown plumage, while those from the Northern Territory of South Australia have the plumage shaded with grey and apparently more so the nearer the specimens are obtained towards the border of North-western Australia.

Mr. Frank Hislop writes me:—"In the Bloomfield River District, North-eastern Queensland, *Myzomela obscura* is found both in the scrub and open forest lands. It feeds upon the nectar of flowers, insects, and also on small spiders. The nest is generally built among the thick leaves of dark foliated trees, such as the ironwood, also in mango and orange trees in gardens. Two eggs are laid for a sitting."

While resident at Ripple Creek Plantation, Herbert River District, Mr. J. A. Boyd, forwarded me a nest and set of two eggs of this species, accompanied by the following note:—"Last week, on the 3rd November 1895, I took a nest and two fresh eggs of *Myzomela obscura*. The nest was built in an orange tree in the garden some six feet from the ground."

The nest received from Mr. Boyd is a small open cup-shaped structure, externally formed of fine brown wiry rootlets and spiral plant tendrils, with a slight addition, particularly at the rim, of cobwebs, the bottom of the nest inside being lined with very fine dried yellowish-brown grasses. It measures externally two inches and a half in diameter by one inch and three-quarters in depth,

the inner cup measuring one inch and three-quarters in diameter by one inch and a half in depth. Although thicker walled than average nests of *Myzomela sanguinolenta*, it is formed of so very much finer materials, that the eggs would be plainly visible to one standing underneath the nest.

The eggs are two in number for a sitting, oval in form, the shell being close-grained, smooth and slightly lustrous. They are almost pure white, dotted, spotted and largely blotched, particularly on the thicker end with pale red and very pale purplish-red, in some places one colour partially overlying the other, with which are intermingled a few subsurface markings of pale purplish-grey. Length (A) $0\cdot67 \times 0\cdot52$ inches; (B) $0\cdot68 \times 0\cdot5$ inches.

Myzomela nigra.

BLACK HONEY-EATER.

Myzomela nigra, Gould, Bds. Austr., Vol. IV., pl. 66 (1848); Handbk. Bds. Austr., Vol. I., p. 558 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 138 (1884).

ADULT MALE—*General colour above dark greyish-black; lesser and median upper wing-coverts like the back, the greater coverts and quills dark brown with a blackish wash, which is more pronounced on the innermost secondaries; tail feathers blackish-brown: head, neck and a central streak extending down the breast dull black; remainder of the under surface white; under tail-coverts white, the basal portion of some of the longer feathers with a narrow central streak of dark brown: bill black; legs and feet black; iris dark brown*" (Bennett). *Total length 4\cdot2 inches, wing 2\cdot7, tail 1\cdot6, bill 0\cdot66, tarsus 0\cdot55.*

ADULT FEMALE—*General colour above brown: wings brown, the greater wing-coverts and innermost secondaries margined with dull rufous-brown: tail-feathers dark brown narrowly edged with whitish-brown; head and hind neck brown, the latter with a slight ashy-shade; lores, feathers below the eye and the ear-coverts brown; all the under surface dull white, slightly washed with brown on the throat, fore neck and upper breast, where some of the feathers are crested with dark brown; under tail-coverts white.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, North-western Australia.

THE present migratory species is widely distributed over the inland portions of the Australian continent. Dr. W. Macgillivray forwarded me a skin for examination obtained in the Cloncurry District, Queensland, together with the following note:—" *Myzomela nigra* occurs in numbers during some years and may not be seen again at all for several years in succession." Mr. K. H. Bennett obtained several of the specimens in the Australian Museum collection, and made the following observations relative to them:—" *Myzomela nigra* is one of the migratory species arriving in the neighbourhood of Mossgiel and the Lachlan River, New South Wales, in the early part of August, and departing about the end of November or early in December. It is extremely shy, but the nest is placed in the most exposed situation, and frequently not more than a couple of feet from the ground. The eggs, two in number, closely resemble in colour those of *Saultoprocta motacilloides*. It breeds during the month of October." There are also specimens in the Australian Museum collection obtained at Byrock and Temora. This species is not found in the coastal districts of New South Wales, but is very common during some years in the extreme western portions of the State.

Mr. G. A. Keartland, who recorded this species from North-western Australia in 1898,* sends me the following note:—" *Myzomela nigra* is occasionally seen in the dense mallee and tea-

* Trans. Roy. Soc. S.A., Vol. XXII., p. 182 (1898).

tree scrubs of Central and North-western Australia. It is rather shy, and builds a small cup-shaped nest which is generally placed in a dry fork of a low bush. Whilst the Calvert Exploring Expedition was crossing the Great Desert in North-western Australia in 1896, Mr. C. F. Wells found a nest on the 2nd October, containing one egg, which was precisely similar to others since received by me from Mr. C. E. Cowie of Central Australia. During the following December, single birds used to come to drink at the water trough of the Fitzroy River Telegraph Station."

From Western Australia, Mr. C. G. Gibson, writes me as follows:—"On the 1st September 1902, at Lake Austin, I found a nest of *Myzomela nigra*, it was a frail cup-shaped structure, composed of dead grasses, and was placed in a horizontal fork of a dead mulga bush. It contained a recently hatched young one. On the 2nd September, I found another nest with two young ones, considerably larger and stronger than the one I found the preceding day. It was built in a horizontal fork in an exposed branch of a mulga bush close to the ground. I nearly walked on this nest as it was a very windy day, and the female sat so close that I had to lift her off by the tail. The Black Honey-eater, as far as I have seen is nowhere plentiful, only isolated pairs being found throughout the whole of the Murchison District. On the 11th September, 1905, I found a nest of *Myzomela nigra* fifty miles to the north-east of Laverton. It was built in the slanting fork of a small dead mulga, eighteen inches from the ground, and contained two eggs much incubated. On the following day I found another on the horizontal stem of a dead mulga two feet six inches from the ground, containing two fresh eggs. It was a large well made nest,—the photograph I send you of it shows the very exposed situation in which these birds build—there are no other limbs above, below, or on either side, the one limb is practically the tree. Two more nests were found partially built the same day, both in horizontal forks of dead mulgas, one containing two eggs on the 16th September, the other one. On the 8th October I found a very small nest in the horizontal fork of a dead mulga, with two much incubated eggs: the cock bird was sitting on the nest. I found another on the following day, in the same position, containing two recently hatched young ones, also a large well made nest, the sides formed of dead daisy stems, built on the horizontal fork of a dead mulga with two chipped eggs."

Mr. Edwin Ashby sends me the following notes from South Australia:—" *Myzomela nigra* occurred in great numbers in a thick she-oak scrub close to Mount Barker in the Mount Lofty Range near Adelaide, in December 1888. They had evidently been nesting freely, as many pairs were busy feeding their young. I do not think that this species again visited the neighbourhood of Adelaide until ten years later, during the spring and early summer of 1898, when they were nesting in suitable localities throughout the Mount Lofty Range."

Mr. A. Zietz, the Assistant Director of the South Australian Museum, found *Myzomela nigra* breeding near Adelaide in 1898, and again in 1902. With a nest of this species he presented to the Trustees of the Australian Museum, he sent me the following note:—" *Myzomela nigra* appears very irregularly in the neighbourhood of Adelaide. Once they bred two years in succession, but many years elapsed before they bred here again. They are generally found in low scrub at the foot of the Mount Lofty Range. The note of this species somewhat resembles that of *Pardalotus xanthopygius*, but unlike that species it is only a single, instead of a double note. The nests are built from two feet and a half to about four feet from the ground. They prefer to nest in the blackened stems of a small species of *Casuarina*, which have been killed by bush fires; other nests may be found in small green *Banksias*, or on the top of some low shrub. Although the nests are built in exposed situations they are somewhat difficult to detect when the female is sitting, for they closely resemble their surroundings. At first you hear the whistle of the male near where the female is sitting, but when you approach he flies a short distance away and perches on some dead branch where he can watch you. The female cautiously glides off the nest and remains quiet in some shrub."

Mr. Charles McLennan writes me:—"On Pine Plains Station, in North-western Victoria, I found two nests of *Myzomela nigra*. Both were built in dry upright forks of Native Hop bushes about three feet from the ground, and each contained two eggs."

The nest is a small open cup-shaped structure, some being formed throughout of dead greyish-white grass stems with an admixture of cobwebs, and slightly lined with fine rootlets or grasses. The nest figured is in the Group Collection of the Australian Museum, and was presented by Mr. A. Zietz. It is built at the junction of several partially cone-covered blackened stems of a *Casuarina*, and is a compact thick-walled structure, the angle of the fork below being



NEST AND EGG OF THE BLACK HONEY-EATER.

filled up with nesting material. Outwardly it is formed of thin dried plant stems, grasses, and rootlets, held together with cobweb, which is loosely worked around two of the upright branches; the inside is scantily lined with fine brown rootlets. It averages externally two inches and three-quarters in diameter by a depth of two and a quarter inches, the inner cup measuring one inch and three-quarters in diameter by one inch in depth. It contained two eggs, although only one is visible in the accompanying figure. The nests of this species differ from those of *M. sanguinolenta* in being usually built between an upright or on the top of a horizontal fork, not suspended by the rim, and is placed in most exposed situations.

The eggs are two in number for a sitting, oval in form, the shell being close grained, smooth and slightly lustrous. They vary in ground colour from a dull creamy-white to a light creamy-brown, and are conspicuously zoned around the larger end with a band of confluent dull olive-brown spots and dots; in some specimens, rather near the middle of the egg. Typically the markings are blurred and indistinct, and are restricted to the zone. In others no markings are visible, only a darker clouded cap or band. A set of two in the Australian Museum collection measures:—Length (A) 0·6 × 0·47 inches; (B) 0·6 × 0·48 inches. Another set measures:—Length (A) 0·65 × 0·47 inches; (B) 0·66 × 0·48 inches.

From the preceding notes it may be gathered that August and the four following months constitute the usual breeding season of this species.

The young female resembles the adult, but has the upper wing-coverts dull rufous, the forehead and crown of the head rufous, the hind neck ashy-brown, the sides of the head, ear-coverts and upper throat dull rufous, the lower throat and fore neck dull white washed with rufous and the feathers more distinctly centred with blackish-brown.

Myzomela pectoralis.

BANDED HONEY-EATER.

Myzomela pectoralis, Gould, Proc. Zool. Soc., 1840, p. 170; *id.*, Bds. Austr., fol., Vol. IV., pl. 65 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 557 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 138 (1884).

ADULT MALE—*General colour above including the forehead, crown of the head and hind neck black; feathers of the lower back grey, with blackish submarginal tips; rump and upper tail-coverts white; wings and tail black; all the under surface including the sides of the neck pure white, crossed on the chest with a narrow but well defined crescentic black band; bill, legs and feet (of skin) black. Total length 4.5 inches, wing 2.7, tail 1.8, bill 0.5, tarsus 0.55.*

ADULT FEMALE?—*Similar in plumage to the male, but with the margins of the feathers on the back buff.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland.

THE Banded Honey-eater is an inhabitant of the northern portions of the continent, the type being described by Gould from a specimen obtained by the late Mr. Bynoe on the north-west coast. The late Mr. T. H. Bowyer-Bower, and Mr. E. J. Cairn obtained specimens near Derby, in North-western Australia, and Mr. G. A. Keartland secured examples near the junction of the Fitzroy and Margaret Rivers. Mr. Alex. Morton, collecting on behalf of the Trustees of the Australian Museum, procured specimens at Port Essington, Mr. J. A. Thorpe and Mr. G. Masters obtained it at Cape York, and Mr. W. E. Armit near the shores of the Gulf of Carpentaria. Mr. G. A. Keartland has received its eggs taken at Marton near Cooktown, Queensland, and there are skins in the Australian Museum collection obtained by Mr. K. Broadbent near Cardwell, and by Mr. George Masters as far south as Port Denison.

Both Gould and Mr. Keartland obtained otherwise mature birds, except some of the feathers on the back being brown or buff. Whether this is a sexual distinction as Gould suggests, I am unable to state from the material before me, but excluding the young and immature birds, the brown or buff margins to some of the feathers of the back are more or less indicated in all the specimens I have examined, but the one adult male procured by Mr. Masters at Port Denison.

Mr. G. A. Keartland writes me:—"In the neighbourhood of the Fitzroy and Margaret Rivers, and Derby in North-western Australia *Myzomela pectoralis* was only found in the vicinity of pools, wells or rivers. They drink frequently, and when flying to water exhibit the same peculiar jerky flight as *Ephthianura albifrons*. The trough at the well in the vicinity of our camp at the Telegraph Station near the Fitzroy River was frequently visited by these birds and I soon obtained specimens for my collection. When the *Eucalypti* were in blossom along the river courses, they assembled in numbers in company with *Ptilotis flavescens* and several other species of small Honey-eaters. They construct a small cup-shaped nest formed only of fine grass and horsehair which is attached at the rim to a thin forked horizontal twig of a *Bauhinia* or any suitable shrub. This bird utters a faint chirping note which is seldom heard."

Mr. Keartland has also kindly sent me a set of the eggs of this species for examination, together with a note received from Mr. Wm. Munt, by whom they were taken:—"A nest of the Banded Honey-eater found on the 17th February, 1900, at Marton, about five miles from Cooktown, Queensland, was a very small open cup-shaped structure, formed of fine strips of tea-tree bark and cobweb, and was fastened by the rim to a thin horizontal fork of a broad-leaved *Melaleuca*, at a height of ten feet from the ground. The nest measured externally about one inch and a half in diameter by one inch in depth, and the eggs could be seen from underneath the frail structure."

The eggs are two in number for a sitting, oval in form, the shell being close grained and its surface smooth, dull and lustreless. They are of a pale creamy-white ground colour with a broad zone of creamy-buff around the thicker end, in which are numerous small dull freckles and streaks of a slightly darker and warmer tint; the zone on one specimen being more distinct and well defined than on the other. Length (A) 0.65 × 0.48 inches; (B) 0.67 × 0.47 inches. In size and colour these eggs more closely resemble those of *Rhipidura rufifrons*, but the zone and markings are of a slightly richer shade.

Young birds have the forehead, crown of the head, hind neck and wings brown; upper back buff, some of the feathers having black centres; lower back and rump brown; upper tail-coverts white; tail dark brown; all the under surface dull white, the cheeks washed with yellow, the ear-coverts entirely rich yellow, the crescentic band on the chest mottled with buff and black. Wing 2.5 inches. Immature males resemble the adults, but have the feathers on the centre of the crown brown, those on the back rich buff; primaries brown, scapulars and secondaries black, the latter edged with buff or white around their tips, the band across the chest black as in the adult, but the ear-coverts are pale yellow. Wing-measurement the same as in the young, 2.5 inches.

Genus ACANTHORHYNCHUS, Gould.

Acanthorhynchus tenuirostris.

SPINE-BILLED HONEY-EATER.

Certhia tenuirostris, Lath. Ind. Orn., Suppl. p. xxxvi., (1801).

Acanthorhynchus tenuirostris, Gould, Bds. Aust. fol., Vol. IV., pl. 61 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 551 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 144 (1884).

ADULT MALE—*Forehead and crown of the head black, with a slight greenish lustre; hind neck reddish-chestnut, the upper back duller where it has a distinct olivaceous tinge; lower back, rump and upper tail-coverts grey; upper wing-coverts grey; primary-coverts and quills black, the innermost scapularies grey, the apical portion of the remainder of the quills edged externally with grey; tail feathers black, the two outermost on either side largely tipped with white and their outer webs narrowly edged with brown; ear-coverts black; cheeks and fore neck white, a patch on the centre of the throat rich brown, on its lower edge and gradually passing into almost a pure white on the chin; a crescentic marking on each side of the neck black; remainder of the under surface and the under tail-coverts rich fawn colour; bill black; legs and feet greyish-brown; iris red. Total length in the flesh 6.5 inches, wing 2.7, tail 2.5, bill 1, tarsus 0.7.*

ADULT FEMALE—*Similar in plumage to the male, but the feathers on the forehead and crown of the head of a distinct greyish shade with hardly any lustre, and the black crescentic marking on each side of the neck not quite so well pronounced. It is also smaller than the male. Wing 2.3 inches.*

Distribution—Queensland, New South Wales, Victoria, South Australia.

THE range of the Spine-billed Honey-eater or "Cobbler's Awl" as it is frequently called, extends from the neighbourhood of Cairns in North-eastern Queensland, south throughout Eastern New South Wales into Victoria and South Australia, to the vicinity of Spencer's Gulf. In New South Wales it is common in the coastal districts also in the Blue Mountains, and appears to evince a preference for sandstone country. It is a tame and familiar species, being found alike in our public and private gardens, where it may be often seen probing flowers with its long spine-like bill. In the bush around Sydney it obtains much of its food, among the flowers of the different species of *Banksia*, *Grevillea*, and also the Native Fuchsia (*Epacris impressa*). Stomachs of these birds examined contained only the remains of insects, principally of small black beetles.

It utters several times in succession a shrill note, resembling the noise produced by a drill on a steel plate, or a close fitting and unoled key rapidly turned in a new door-lock.

Specimens in the Australian Museum collection obtained by Messrs. E. J. Cairn and Robt. Grant near Cairns, Queensland, are slightly smaller and the centre of the throat is paler than examples procured in the neighbourhood of Sydney. Dr. W. A. Angove informs me that it is very common and breeds at Tea-tree Gully near Adelaide.

The nest is a cup-shaped structure externally formed of fine strips of bark or bark-fibre and dried grasses, and warmly lined inside with downy feathers, several of which are often worked perpendicularly into the sides and the ends curl over the inner cup; *Casuarina* leaves and horse-hair are also used in the construction of some nests. An average nest measures externally three inches in diameter by two inches and a half in depth, the inner cup measuring two inches in diameter by one inch and a half in depth. The nest is attached to the rim to the horizontal



SPINE-BILLED HONEY-EATER.

leafy twigs of any suitable shrub or tree. Usually it is built at an height of from four to fifteen feet from the ground. Further on it will be seen that the altitude at which the nest is placed, in the neighbourhood of Sydney, is as varied as the trees selected as nesting sites.

The eggs are usually two, rarely three in number for a sitting, oval in form, and somewhat pointed at the smaller end, the shell being close-grained, smooth and lustrous. They are of a fleshy-buff ground colour, and of a darker shade towards the larger end, where they are spotted with chestnut or rich reddish-brown, some specimens having also a few underlying spots of dull grey, or scattered surface markings distributed over the shell. Frequently the markings are penumbral, or are confined to a clouded band of a richer shade of the ground colour. In some the ground colour is almost pure white, except on the larger end where it is tinged with buff. A set of two taken at Canterbury, on the 16th September, 1896, measure:—Length (A) 0·79 × 0·58 inches; (B) 0·78 × 0·68 inches. A set of two taken at Roseville, on the 22nd September, 1906, measure:—Length (A) 0·75 × 0·55 inches; (B) 0·74 × 0·55 inches.

Nestlings just prior to leaving the nest have the upper parts including the crown of the head dull grey washed with olive; all the under parts dull fawn colour; culmen fleshy-brown, lower mandible and cutting edge of upper mandible rich yellow; legs fleshy-grey, feet grey. Wing 1·7 inches. A young male in the Australian Museum collection in this stage of plumage has the cheeks whitish. Wing 2·5 inches.

There is a semi-albino of this species in the Australian Museum collection procured at Middle Harbour in 1876.

At Roseville I found a nest on the 24th September, 1898, in a *Banksia*, with two recently hatched young, which the female was very reluctant to leave. Earlier in the same month I saw fledgelings at Springwood on the Blue Mountains, being fed by their parents, and again two more having their wants attended to at Enfield, on the 6th January. At Roseville I found a nest in a Turpentine tree eight feet from the ground. It contained a single young bird which fluttered out of the nest and settled on my coat. It lived two days, and is now a specimen in the Australian Museum collection. At Canterbury I obtained nests with fresh eggs on the 10th September, and the 8th November, 1893, both nests were built in *Melaleucas*, about twelve feet from the ground. At Kingsgrove I saw a nest being built on the 26th December, 1893, in

a *Melaleuca*. On the 3rd of January, 1891, at Ashfield, I saw a bird building its nest in a most unusual position. It was among the thin rigid leaves in the topmost branches of an acclimated Pine (*Pinus insignis*), and fully thirty feet from the ground. Only by seeing the bird repeatedly carrying nesting material was it discovered, and at that height and the thickness of the foliage it was difficult to distinguish from some of the cones. Mr. K. H. Bennett climbed to this nest on the 22nd January following, when it contained two incubated eggs.

On the 1st September, 1906, at Roseville I saw a nest built in a tea-tree overrun with climbing plants, containing two fresh eggs, another one being built on the 20th instant in a *Pittosporum undulatum*, and two days later I saw Mr. R. Meikle climb and obtain two fresh eggs from a nest built in the terminal leafy branches of a stringy-bark fifty feet from the ground; a most unusual site, and one that had I not seen the eggs and one of the birds procured belonging to it, could hardly have credited it belonged to this species.



NEST OF THE SPINE-BILLED HONEY-EATER

The nest figured, which contained two fresh eggs, was taken at Roseville, on the 24th October, 1905. It is a cup-shaped structure externally formed of thin strips of bark slightly held together with cobwebs the inside being lined with finer dried grasses and fowl's feathers, the ends of several of the latter curling over and partially concealing the inner portion of the structure. It is attached by the rim to three thin leafy stems of a Turpentine tree, and was about ten feet from the ground. Externally it averages three inches in diameter by two inches and a quarter in depth, the inner cup measuring two inches in diameter by one inch and a half in depth.

On the 3rd January, 1897, Mr. S. W. Moore found a nest at Wentworth Falls on the Blue Mountains, with two fresh eggs, and one in the same locality on the 14th January of the previous year, with two much incubated eggs. At Eastwood Mr. Moore also found a nest containing one egg and one young one, on the 21st January, 1893. Mr. Frank Hislop found several nests at Lithgow on the Blue Mountains during the latter part of 1899. They were nearly all built in gum saplings on the sides of creeks. Two nests only were taken; one contained a set of two fresh eggs on the 24th September, the other on the 21st October, a set of three fresh eggs. Two eggs of the latter set had the ground colour rich buff, in the other it was almost pure white, the larger end being washed with buff; all were spotted with dull chestnut-brown.

The breeding season of this species usually commences in August and continues until the end of January, or early in February, during which time two or more broods are reared.

Acanthorhynchus dubius.

TASMANIAN SPINE-BILLED HONEY-EATER.

Acanthorhynchus dubius, Gould, Proc. Zool. Soc., 1837, p. 25; North, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. II., p. 108 (1887).

ADULT MALE—*Like the adult male of ACANTHORHYNCHUS SUPERCILIOSUS, Latham, but smaller, the plumage of the back, centre of throat, and the breast distinctly darker and richer in colour. Total length 5 inches, wing 2.5, tail 2.2, bill 0.9, tarsus 0.65.*

ADULT FEMALE—*Differs in a similar manner from the male, as does the female of A. TENUIROSTRIS. Wing 2.25 inches.*

Distribution—Tasmania.

THERE are specimens in the Australian Museum collection of this form obtained by Mr. G. Masters at Mount Wellington and Brown River, Tasmania. I have also examined others in the Macleay Museum at the University of Sydney. It is a close ally of *Acanthorhynchus tenuirostris* but typically may be distinguished by its smaller size and darker plumage.

Dr. Lonsdale Holden sends me the following notes:—"The Spine-bill is generally distributed in Tasmania. I have seen this bird catching flies in my garden as fearlessly and industriously as *Rhipidura diemenensis*, I have also seen it frequenting a garden in the centre of Hobart. The only nest of this species I ever came across was in a tree on the bank of a river in uninhabited country. Sandstone rocks and little cliffs border the stream at one angle of its course, and the rock is water and weather worn into ledges and small caves. In front of one cave a box tree hung its branches in a thin veil. In this veil and suspended by the rim was a deep cup-shaped nest compactly and solidly formed externally of moss-like green lichens collected from some dead branches of the box tree. The cock bird was sitting. Stretching with difficulty from the rock, I disturbed him, and reached my finger to touch the eggs, when the hen bird fluttered into the box tree and sat within a few inches of my face. The nest was clearly visible from the cave, but by no means so from the river. I once saw a Spine-bill with the outer tail-feathers entirely white instead of only tipped with white."

The eggs are not to be distinguished from those of the continental form *A. tenuirostris*. Two eggs in the Australian Museum collection taken near Hobart, in October 1885, are of a pale buff ground colour, passing into a faint reddish-buff on the larger end, and have small spots and irregular markings of deep chestnut-brown scattered over the larger end, where are intermingled a few underlying markings of pale bluish-grey. Length (A) 0.73 × 0.53 inches; (B) 0.75 × 0.54 inches.

Acanthorhynchus superciliosus.

WESTERN SPINE-BILLED HONEY-EATER.

Acanthorhynchus superciliosus, Gould, Proc. Zool. Soc., 1837, p. 21; *id.*, Bds. Austr., fol., Vol. IV., pl. 62 (1848); *id.*, Handbk. Bds. Aust., Vol. I., p. 553 (1865); Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 115 (1884).

ADULT MALE—*General colour above olive-brown; upper wing-coverts and quills brown, the latter broadly edged and some of the median and greater coverts indistinctly margined with greyish blue; tail feathers dark brown, the three outermost on either side largely tipped with white, and more or less edged with brown on their outer webs, except on the central portion of the outermost; forehead and crown of the head like the back but of a more decided shade of brown; feathers in front*

of the eye and the ear-coverts blackish; a line of feathers extending behind the upper portion of the eye white; chin and cheeks white; throat, face, neck and a collar on the hind neck chestnut-red, slightly paler on the latter; across the chest a well defined white crescent followed by another one of blackish brown on the upper breast; remainder of the under surface and under tail-coverts pale buff. Total length 5.5 inches, wing 2.5, tail 2.3, bill 0.7, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Western Australia.

THIS very distinct species was described by Gould in the Proceedings of the Zoological Society in 1837. The habitat there given is Van Diemen's Land, but Gould corrected his mistake later on when figuring this species in his folio edition of the Birds of Australia.

Mr. George Masters collecting on behalf of the Trustees of the Australian Museum, informs me that he found it very abundant at King George's Sound, and that in habits and the situations it frequented, it resembled the eastern representative of the genus *A. tenuirostris*. Mr. Masters procured nine specimens during his first visit to that part of Western Australia in 1866, and ten specimens on his second visit in 1868. Some adult males are paler on the breast than others. Wing-measurement 2.5 to 2.6 inch; that of a specimen labelled adult female is 2.5 inches.

Mr. Edwin Ashby writes me: "I found *Acanthorhynchus superciliosus* very numerous in the neighbourhood of Albany in September 1899, and again near Perth, Western Australia, in August 1901. In the former locality they seemed to be especially fond of the flowers of a species of *Banksia*."

Relative to this species Gould remarks,* "The nest, which is constructed among the large-leaved *Banksia*, is of a round compact form, and is composed of dried fine grasses, tendrils of flowers, narrow threads of bark, and fine wiry fibrous roots matted together with *Zamia* wool, forming a thick body, which is warmly lined with feathers and *Zamia* wool mingled together; the extreme diameter of the nest is three inches, and that of the cavity about one inch and a quarter. The eggs are two in number, nine lines long by six and a half broad; the ground colour in some is a delicate buff, in others a very delicate bluish-white, with a few specks of reddish-brown distributed over the surface, these specks being most numerous at the larger end, where they frequently assume the form of a zone. The breeding season is in October.

A set of two in Mr. G. A. Keartland's collection, taken by Mr. E. J. Harris, in October 1899, from a nest in a dog-wood bush at Bunbury, Western Australia, are oval in form, the shell being close-grained, smooth and lustrous. They are of a pale fleshy-white ground colour, which passes into a light red on the larger end, where there are dots, spots and small irregular shaped markings of dull chestnut-red, the remainder of the shell with the exception of a few dots and spots being devoid of markings. These eggs bear a close resemblance to those of *Acanthorhynchus tenuirostris* of Eastern Australia, but they are less pointed at the smaller ends than are typical eggs of the latter species. Length (A) 0.73 × 0.52 inches; (B) 0.71 × 0.51 inches.

* Gould, Handbk. Bds. Austr., Vol. I., p. 554 (1865).

EXPLANATION OF PLATE A. 9.

Nest and Eggs of *PACHYCEPHALA GUTTURALIS*.

White-throated Thickhead.



EXPLANATION OF PLATE A. 10.

Nest of *FALCUNCULUS FRONTATUS*.
Crested Shrike-Tit.



EXPLANATION OF PLATE A. 11.

Nest and Eggs of MELIORNIS SERICEA.

White-cheeked Honey-eater.



EXPLANATION OF PLATE B. VIII

- Figs. 1, 2. *GRAUCALUS MELANOPS*.
Black-faced Cuckoo-Shrike.
- Figs. 3, 4. *GRAUCALUS PARVIROSTRIS*.
Small-billed Cuckoo-Shrike.
- Fig. 5. *GRAUCALUS MENTALIS*.
Varied Cuckoo-Shrike.
- Figs. 6, 11. *CRACTICUS RUFESCENS*.
Black Crow-Shrike.
- Figs. 7, 8, 9. *CRACTICUS NIGRIGULARIS*.
Black-throated Butcher-bird.
- Fig. 10. *CRACTICUS PICATUS*.
Pied Butcher-bird.
- Figs. 12, 13. *SPHECOTHERES MAXILLARIS*.
Fig-bird.
- Figs. 14, 15. *SPHECOTHERES FLAVIVENTRIS*.
Yellow-breasted Fig-bird.
- Fig. 16. *CRACTICUS LEUCOPTERUS*.^{*}
White-winged Butcher-bird.
- Figs. 17, 18, 19. *CRACTICUS DESTRUCTOR*.
Butcher-bird.
- Fig. 20. *CRACTICUS CINEREUS*.
Tasmanian Butcher-bird.
- Figs. 21, 22. *PTEROPODCYS PHASINELLA*.
Ground Cuckoo-Shrike.
- Figs. 23, 24, 25. *GRAUCALUS HYPOLEUCUS*.
White-bellied Cuckoo-Shrike.

^{*} = *CRACTICUS DESTRUCTOR*, *Tenn.*, North, Proc. Linn. Soc. N.S.W., August, 1906.



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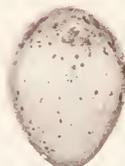
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EXPLANATION OF PLATE B. IX.

- Fig. 1. *CACOMANTIS FLABELLIFORMIS*.
Fan-tailed Cuckoo.
- Fig. 2. *PIEZORHYNCHUS NITIDUS*.
Glossy Flycatcher.
- Fig. 3. *PETRECA PHENICEA*.
Flame-breasted Robin.
- Fig. 4. *PETRECA LEGGII*.
Scarlet-breasted Robin.
- Fig. 5. *ERITHRODRIAS RHODINOGASTER*.
Pink-breasted Robin.
- Fig. 6. *ERYTHRODRIAS ROSEA*.
Rose-breasted Robin.
- Figs. 7, 8. *APHELOCEPHALA LEUCOPSIS*.
Squeaker.
- Figs. 9, 10. *HYLACOLA PYRRHOPYGIA*.
Red-rumped Scrub-warbler.
- Fig. 11. *HYLACOLA CAUTA*.
Shy Scrub-warbler.
- Fig. 12. *PETROCHELIDON NIGRICANS*.
Tree Swallow.
- Figs. 13, 14. *NEOSITTA CHRYSOPTERA*.
Orange-winged Bark-pecker.
- Fig. 15. *NEOSITTA PILEATA*.
Black-capped Bark-pecker.
- Fig. 16. *NEOSITTA LETOCEPHALUS*.
White-headed Bark-pecker.
- Figs. 17, 18. *PETRECA GOODENOVII*.
Red-capped Robin.
- Fig. 19. *MELIORNIS AUSTRALASIANA*.
Horse-shoe Honey-eater.
- Fig. 20. *MELIUREPTUS BREVIROSTRIS*.
Short-billed Honey-eater.
- Fig. 21. *MYIAGRA RUEBUCLA*.
Leaden-coloured Flycatcher.
- Figs. 22, 23. *MYIAGRA CONCINNA*.
Pretty Flycatcher.
- Fig. 24. *CISTICOLA EXILIS*.
Grass Warbler.
- Fig. 25. *MEGALURUS GRAMINEUS*.
Little Grass-bird.
- Fig. 26. *RHIPIDURA RUFIFRONS*.
Rufous-fronted Fantail.
- Fig. 27. *APHELOCEPHALA NIGRICINCTA*.
Black-banded Sycaker.
- Fig. 28. *RHIPIDURA ALBISCAPA*.
White-shafted Fantail.
- Fig. 29. *RHIPIDURA ALBAUDA*.
White-tailed Fantail.
- Fig. 30. *RHIPIDURA DIEMENENSIS*.
Tasmanian Fantail.
- Fig. 31. *MYZOMELA OBSCURA*.
Dusky Honey-eater.
- Fig. 32. *MYZOMELA SANGUINOLENTA*.
Sanguineous Honey-eater.
- Fig. 33. *MYZOMELA NIGRA*.
Black Honey-eater.
- Fig. 34. *CINNYRIS FRENATA*.
Australian Sun-bird.
- Fig. 35. *SMICRORNIS BREVIROSTRIS*.
Short-billed Scrub-Tit.
- Fig. 36. *SMICRORNIS FLAVESCENS*.
Yellow-tinted Scrub-Tit.



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of the eye and the ear-coverts blackish; a line of feathers extending behind the upper portion of the eye white; chin and cheeks white; throat, fore neck and a collar on the hind neck chestnut-red, slightly paler on the latter; across the chest a well defined white crescent followed by another one of blackish-brown on the upper breast; remainder of the under surface and under tail-coverts pale buff. Total length 5.5 inches, wing 2.5, tail 2.3, bill 0.7, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Western Australia.

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* Gould, Handbk. Birds Austr., Vol. I., p. 534 (1865).

Genus *PTILOTI*S. Swainson.*Ptilotis lewini*.

LEWIN'S HONEY-EATER.

Ptilotis lewinii, Swains., Class. Birds, Vol. II., p. 326 (1837); Gould, Handbk. Bds. Austr., Vol. I., p. 503 (1865).

Ptilotis chrysotis, Gould, Bds. Austr., fol., Vol. IV., pl. 32 (1848).

Ptilotis lewini, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 229 (1884).

ADULT MALE—General colour above dull olive-green; wings and tail brighter, inclining to olive-yellow, the inner webs of the quills and all but the central pair of tail feathers brown; head dull olive-green, with a blackish-grey wash on the forehead; feathers between the nostril and those encircling the eye and the fore part of the cheeks blackish; below the eye a short streak of small pale yellow feathers; ear-coverts dark silky-steel-grey, followed by a patch of feathers of a slightly brighter yellow than those below the eye; throat and all the under surface olive-grey slightly tinged with green, which is more distinct on the fore neck and breast, most of the feathers having more or less conspicuous darker centres, those on the centre of the breast and the abdomen having very dull olive-yellow margins; under tail-coverts olive-grey with brown centres; thighs dull olive-green; outer series of the under wing-coverts fulvous-yellow; bill black; gape straw-white; legs and feet light fleshy-brown; iris bluish-grey. Total length in the flesh 9 inches, wing 4.2, tail 3.9, bill 0.7, tarsus 0.95.

ADULT FEMALE—Similar in plumage to the male but smaller.

Distribution—Queensland, New South Wales, Victoria.

LEWIN'S Honey-eater is freely dispersed in favourable situations throughout the eastern portions of Queensland, New South Wales and Victoria. It gives decided preference for the coastal brushes, and the contiguous mountain ranges, and unless associated with its young is generally met with in isolated pairs. I found it numerous in the thick humid undergrowth of the Strzelecki Ranges in South Gippsland, Victoria, also in somewhat similar country at the head of Twofold Bay, near the southern border of New South Wales. It occurs throughout the Illawarra District, and I have observed it on the Upper Clarence River. It is also found on the Blue Mountains, but I have never seen a specimen from the open forest lands beyond the western slopes of that range. Near Sydney it is more often met with, or its rapidly quavering whistling notes heard, on the sides and beds of creeks overgrown with vine-covered Lilly-pilly, Coachwood, and Black Wattle trees. It frequents chiefly the gullies on the highlands of the Milson's Point Railway Line and Middle Harbour, also the more level country between Manly and Narrabeen.

Mr. Edwin Ashby forwarded me a specimen obtained by him at Drouin, Victoria, and also sent me the following note:—“I found *Ptilotis lewini* the most common bird in the Blackall Ranges, to the north of Brisbane, Queensland. The settlers there informed me that they came in swarms amongst the fruit trees when the fruit was ripe and did much damage. They nest in the orange trees.”

Stomachs of these birds examined contained the remains of insects and portions of various wild fruits. I have watched these birds diligently searching the slightly roughened bark of a small gum sapling for upwards of a quarter of an hour, exploring every branch and apparently obtaining small insects in the crevices of the bark. I have also seen it pulling off the flowers of a daphne in my garden. The fast diminishing cover for this and many other species, owing to the land being cleared for building purposes, is rapidly driving many species once common in the district farther afield. When procurable too, this species feeds largely upon all kinds of cultivated soft-pulped fruits. At Roseville it attacks principally the summer fruits, but it is not voracious enough in that locality to do any considerable damage.

The male is distinctly larger than the female, the wing measurement of average adult specimens obtained in the Illawarra District, New South Wales, being respectively 4.25 and 3.75 inches. The wing-measurement of an adult male, obtained by Mr. A. F. Smith, at Hambleton near Cairns, Queensland, is 3.85 inches. He writes me as follows:—"This bird was shot near the mill in a deserted garden, where I saw and heard several. In May and June I also saw and heard some at the Upper Barron Crossing, near Atherton. *Ptilotis lewini* is fairly common in winter, but I think goes away during the summer months, but cannot be certain of it, as it is not readily distinguished from *P. notata* in the trees."

The nest is a large cup-shaped structure, outwardly formed of long thin strips of bark, plant tendrils, egg-bags of spiders, and a few dead leaves, interwoven and held together with a slight addition of spider's web; inside it is neatly lined with dried grasses and a thick felting formed of the glistening white silky down from the seed-pods of the introduced "Cotton Plant," or thistle down. Some nests are first lined with black wiry rootlets, or dried flowering stems, and have horse-hair intermingled with the down of the inner lining. Others built in humid mountain gullies are thickly coated on the outside with bright green moss, but in all I have examined the lining consisted principally, if not entirely of downy seeds. Like the nests of many other birds the materials of which they are formed vary according to the localities where they are built. It is suspended by the rim to a thin forked horizontal branch of a tree, frequently in one growing near water, or in the bottom of a mountain gully, at an height varying from eight to twenty feet from the ground. Near Sydney the Lilly-pilly (*Eugenia smithii*) and the Coach-wood (*Ceratopetalum apetalum*) are the trees most frequently selected as nesting-sites. One found by Mr. C. G. Johnston, and the writer in a Lilly-pilly at the bottom of a gully near Chatswood, had the outer portion composed chiefly of pieces of newspaper. The framework of this nest was commenced on the 4th September 1898, and eighteen days after it was completed, and contained two fresh eggs. On the following day, Mr. Johnston visited a gully five miles away on the outskirts of Pymble, where I had heard a pair of these birds, and after a short search he was successful in discovering their nest in a Coachwood containing two fresh eggs. The nests of both of these pairs of birds were found again, respectively on the 15th and 17th of the following month, built in similar trees and within fifteen yards of their previous nesting sites. Each contained a pair of fresh eggs. Although I visited the first nest we found at Chatswood several times, I only saw the birds once while it was in course of construction. When it contained eggs the female was sitting while we were under the tree, and remained until the nest was almost reached. The nest figured on Plate A 12, is built in a Coachwood, and was taken by Mr. C. G. Johnston at Pymble, on the 23rd September, 1898, it measures externally four inches and a half in diameter by three inches and a half in depth; internal diameter three inches, depth two inches.

Two, seldom three, eggs are laid for a sitting. They vary from true ovals to elongate-ovals in form, and in ground colour from pure pearly-white to pale fleshy-white, over which is distributed minute dots, spots, or small irregular shaped blotches varying from light red to rich reddish or purplish-black. As a rule the markings are sparingly distributed and predominate on the thicker end, where in some instances they assume the form of a zone. A set taken from the above described nest are of a delicate fleshy-white ground colour with very minute dots and medium sized irregular shaped blotches of light red distributed over the surface of the shell. In one specimen they predominate on the thicker end and form an ill-defined zone. Length (A) 1×0.74 inches; (B) 1.06×0.72 inches. A typical set taken at Chatswood on the 15th October, 1898, are of a lustrous pearly-white with dots and rounded spots of rich reddish-black distributed over the larger end of the shell. Length (A) 1.03×0.72 inches; (B) 1.07×0.72 inches.

Mr. E. H. Lane has a set of eggs of this species in his collection with an egg of the Pallid Cuckoo found in the same nest. This set was taken on the Richmond River, on the 9th December, 1902.

September and the four following months constitute the usual breeding season of this species in New South Wales. In company with Mr. S. W. Moore, and his son, Mr. W. L. Moore, at Waterfall, on the 2nd January, 1899, the latter found a nest with two partially incubated eggs. In the same locality Mr. W. L. Moore found a nest on the 12th January, containing two heavily incubated eggs and a recently hatched young bird, which he believed was a Pallid Cuckoo. At Leura he found a new nest and saw the birds at it, on the 20th January, 1900.

At Copmanhurst, Mr. George Savidge showed me a set of two eggs taken by him on the 27th December, 1894, also an egg of the Pallid Cuckoo, found in the same nest. Another nest of Lewin's Honey-eater he examined, contained a young Pallid Cuckoo, and he saw an adult Pallid Cuckoo leave the bush in which the nest was placed. Later on he forwarded me a photograph of a nest taken on the 2nd November, 1902, in an orange tree in his garden at Copmanhurst, containing two fresh eggs. The nest is somewhat similar to the one found at Chatswood, but pieces of white paper are principally used in its outer construction. Evidently, he informs me, the same pair of birds built in the tree again, for he took fresh eggs from a nest in it on the 30th December, 1902.

Ptilotis notata.

YELLOW SPOT HONEY-EATER.

Ptilotis notata, Gould, Ann. Mag. Nat. Hist., 3rd Ser., Vol. XX., p. 269 (1867); *id.*, Suppl. Bds Austr., fol. pl. 41 (1869).

Ptilotis analoga, (*part*) Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 227 (1884); North, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. IX., p. 39 (1894).

ADULT MALE—*Like the adult male of Ptilotis Lewini*, Swainson, *but smaller, and having the upper parts less distinctly tinged with green, the basal portion of the ear-coverts blackish, the yellow patch of feathers behind the ear narrower and heart-shaped in form; all the under surface of a uniform pale olive-grey. Total length in the flesh 6·8 inches, wing 3·3, tail 2·8, bill 0·7, tarsus 0·75.*

ADULT FEMALE—*Similar in plumage to the male, but smaller.*

Distribution—North-eastern Queensland.

THE present species is a representative of *Ptilotis lewini*, in the north-eastern portions of the Australian continent, its range extending to the islands of Torres Strait. These species inosculate in the neighbourhood of Cairns. When compared with *P. lewini* in addition to its smaller size, it may be chiefly distinguished by having the basal portion of the ear-coverts blackish, not blackish-silvery or steel grey; in some specimens a blackish wash also extends around the yellow patch of feathers behind the ear-coverts, which is narrower and of different form. The under parts too, are of a lighter uniform olive-grey, and the feathers on the fore neck and breast have not that sheen on their margins as is seen in adult specimens of *P. lewini*, when held away from the light. Gould's figures of *Ptilotis notata* in his "Supplement to the Birds of Australia" are somewhat misleading, as they show the fore neck and breast distinctly streaked, whereas they are uniform. The wing-measurement of an adult male and female obtained near Cairns is respectively 3·25 inches and 2·9 inches. The vernacular name too, given it by Gould tends to give one the erroneous impression that it is a yellow spotted Honey-eater. Certainly it has a yellow spot on each side of the head, but the remainder of the plumage is uniform.

During the Voyage of the Chevert in 1875, Mr. George Masters states² that *Ptilotis notata* was common at Cape York and all the wooded islands of Torres Strait, eight specimens being

² Proc. Linn. Soc. N.S.W., Vol. I., p. 55 (1877).

obtained at Cape York, three at Cape Grenville, and three on Darnley Island. In the Australian Museum Collection are specimens obtained by Mr. A. Morton at Cape York, by Messrs. E. J. Cairn and R. Grant at Herberton, by Mr. A. F. Smith at Hambleton near Cairns, and by Mr. J. A. Boyd at the Herbert River, its most southern limit yet recorded. A spirit specimen was also received from the Bloomfield River, respecting which Mr. Frank Hislop subsequently furnished the following interesting notes:—" *Ptilotis notata* is found both in the forest and scrub. Its food consists of insects, nectar of flowers and small berries; it is also very fond of bananas, paw-paws, mangoes, granadillas, and other soft cultivated fruits. I have often found the nests of this species, built in thick shrubs growing on the margin of a lagoon. The outer portion of the nest is usually constructed of strips of bark, but when built near where there are Fan Palms the birds utilize the fibre which covers the butts of the leaves, the inside being lined with white plant down. Two eggs are usually laid for a sitting, but some times I have found nests containing three. The breeding season generally commences in September and continues until the middle of December. I have frequently referred to a tree growing in the Bloomfield River District, known locally from the adhesive nature of its seeds as the 'Fly-catcher Tree.' I have found several birds caught by the seeds and seed-pods as they lay on the ground—Torres Straits Pigeons, a Rufous Owl, and a Crested Hawk. Frequently I have found smaller birds caught, and among them, more than any other *Ptilotis notata*. This is, I expect, probably owing to the fact that it likes building in the thick foliage of this tree, and I have liberated several which would never have been able to free themselves. The feathers were in some cases stuck together, to such an extent with these seeds that neither wings or legs could be used. The aborigines on the Bloomfield River who call the tree "Mi-yir," believe that cutting or bruising it will cause rain, and it is one of the trees used by some of the old men, who professed to be rainmakers." At my request, Mr. Hislop subsequently obtained specimens of this tree, and its pods and seeds from his brother, Mr. Bertie Hislop, and they have been identified by Mr. F. Manson Bailey, F.L.S., Colonial Botanist, Brisbane, as those of *Pisonia brunoniana*.

Mr. A. F. Smith writes me from Hambleton, as follows:—" *Ptilotis notata* is resident here throughout the year and is very common in the scrub about the creeks, and also frequents private gardens, and is fond of exploring the blossoms of Cocoa-nut Palms. In this district it appears to be the most plentiful of the genus *Ptilotis*, and favours trees with dense foliage. I have never seen it in forest country. The note of this species resembles 'chivee,' as near as anything. The number of times it is sounded varies, generally from three to ten, sometimes slowly, at others faster; the latter notes are fainter the more often they are repeated. Its food consists of insects and small fruits, one I wounded and kept in captivity disgorged several berries about the size of currants. I fed it on milk and bananas of which it seemed very fond."

Nests of this species taken by Mr. J. A. Boyd, at Ripple Creek, Herbert River, are cup-shaped structures, outwardly formed of the hair-like fibre of the Cocoa-nut Palm, dried skeletons of leaves and pieces of white paper-like bark of a *Macaleuca*, the inside being beautifully lined with downy glistening white seeds. Externally they average three inches and a half in diameter by two inches and a half in depth, the inner cup measuring two inches and a half in diameter by two inches in depth. They were suspended by the rim to thin forked horizontal branches of Mango trees, at a height of five or six feet from the ground.

The eggs are usually two, rarely three in number for a sitting, oval in form, the shell being close-grained, smooth and slightly lustrous. They are pure white, with small blotches, rounded dots and spots, varying from a rich reddish-black to a purplish-brown, the markings as a rule being confined to the thicker end, and closely resemble small typical eggs of *Ptilotis lewini*. Some specimens have only a few large blotches on one side, or on the thicker end. A set taken by Mr. Boyd, at Ripple Creek, on the 11th September, 1893, measures as follows:—Length (A) 0.92 × 0.67 inches; (B) 0.93 × 0.67 inches. Another set taken on the 30th October, 1894,

measures:—Length (A) 0·92 × 0·66 inches; (B) 0·9 × 0·65 inches. A set taken by Mr. Frank Hislop, at Wyalla, Bloomfield River, measures:—Length (A) 0·89 × 0·65 inches; (B) 0·88 × 0·65 inches.

September and the five following months constitute the usual breeding season of this species. Mr. Boyd supplied me with the following information respecting a nest he had under close observation from the time it was started until the young ones left the nest. It was built upon the frond of a fern, eighteen inches from the ground, growing in a fernery attached to Mr. Boyd's house, and opposite his office, to which people were constantly coming through the day, a piano also that was in frequent use by the children, being within fifteen feet of the nest. During the period of incubation, the female sat steadily, and did not attempt to fly when looked at by one only a few feet away, the nest being so deep that only the bill and tail of the bird were visible. This bird was quite tame, and used to fly to and fro through the dining-room where a number of people were seated at dinner. The nest was commenced on the 7th December, 1893, and contained three eggs on the 15th instant; two young ones were hatched on the 28th instant, and a third next day; the period of incubation being fourteen days. The young birds left the nest on the 12th January.

Ptilotis gracilis.

LESSER YELLOW SPOT HONEY-EATER.

Ptilotis gracilis, Gould, Proc. Zool. Soc., 1866, p. 217; Sharpe, Rep. Voy. H.M.S. "Alert," p. 19 (1884); Salvad., Ann. Mus. Civ. Gen. Vol. 29., p. 502 (1889); North, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. IX., p. 40 (1894).

Ptilotis analoga, (part) Salvad., Orn. Pap. et Molucc. Vol. II., p. 327 (1884); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 22 (1884).

ADULT MALE.—Like the adult male of *PTILOTIS NOTATA*, Gould, but smaller and having a comparatively larger bill. In other respects it differs in having the cheeks, and the under surface lighter and of a more distinct greyish shade, the blackish wash to the feathers between the eye and the nostril, and at the base of the ear-coverts is duller in colour and less pronounced, and the ear-plumes are of a much paler yellow. Total length 5·5 inches, wing 2·9, tail 2·45, bill 0·68, tarsus 0·7.

ADULT FEMALE.—Similar in plumage to the male but smaller. Wing 2·7 inches.

Distribution—Northern Queensland, Northern Territory of South Australia.

IN the "Catalogue of Birds in the British Museum,"^{*} Dr. Gadow followed Count Salvadori† in placing the name of the present species, as a synonym of *Ptilotis analoga*, Reichenbach. *Ptilotis gracilis* described by Gould from a single specimen obtained at Cape York, was as I pointed out in the "Proceedings of the Linnean Society of New South Wales" in 1894,‡ a decidedly smaller race of *P. analoga*, of which there were similar specimens in the Macleay Museum, procured at Cardwell. At that time I was not aware that Dr. R. B. Sharpe, in his Report of the "Voyage of H.M.S. 'Alert,'"§ differed from Dr. Gadow, and recognised the two Australian forms *P. notata* and *P. gracilis*. Nor that Count Salvadori had reinstated *P. gracilis* as a good species on the authority of a male collected by Dr. Loria at Port Darwin on the 6th May, 1889. It is the only occasion I have ever known this species to be received from the Northern Territory of South Australia; the genus *Ptilotis* as a rule in the many large collections

* Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 227 (1884).

† Orn. Pap. et Molucc., Vol. II., p. 327 (1884).

‡ Proc. Linn. Soc. N.S. Wales, 2nd ser., Vol. IX., p. 40, (1894).

§ Rep. Voy. H.M.S. "Alert," p. 19 (1884).

Ann. Mus. Civ. Gen., Vol. 29., p. 502 (1889)

received from that portion of Northern Australia, being solely represented by a single species—*Ptilotis unicolor*.

The above description is taken from a specimen procured by Mr. K. Broadbent at Cape York, and it has the largest wing-measurement of four examples of this species in the Australian Museum collection. The wing-measurement of a female procured by Mr. Broadbent at Cardwell in 1874 is 2.7 inches, and agree in size with those of two specimens in the Macleay Museum, obtained by the late Mr. Edward Spalding at Cardwell. In his "Tabular List of Australian Birds," Dr. E. P. Ramsay also records the Gulf of Carpentaria District in the range of this species.

Mr. Frank Hislop writes me:—"In the Bloomfield River District, North-eastern Queensland, *Ptilotis gracilis* generally builds in the forest lands or just at the edges of the scrub. The nest like that of *Ptilotis notata* is suspended between a small forked branch, and is composed on the outside of strips of bark fibre and green moss, and is lined inside with the fluff or down off the seeds of a scrub vine. The nest is usually low down, and two eggs are laid for a sitting. My brother Bertie found a nest with two eggs on the 11th September, and I obtained two, one on the 26th October, and the other on the 10th November. The native name for *Ptilotis gracilis*, is 'Wallewtalpagee,' and is the same as they give to *Ptilotis notata*. Although these two species are so much alike, their notes are entirely different."

A nest taken by Mr. J. A. Boyd, at Ripple Creek, on the 24th October, 1896, is cup-shaped, outwardly formed of bark fibre and large thin pieces of *Melaleuca* bark, thickly coated with green moss on the exterior of the upper half of the structure, the inside being thickly lined except near the rim with white plant-down. Externally it measures two inches and three-quarters in diameter by two inches in depth; the inner cup measuring two inches and a quarter in diameter by one inch and a half in depth.

The eggs are two in number for a sitting and oval in form, the shell being close grained and the surface smooth and glossy. They are of a reddish-flesh ground colour, with dots and spots of reddish-chestnut and purplish-red confined principally to the larger end. The markings on one specimen taken from the above described nest are irregularly scattered almost entirely over the larger end, in the other specimen they are confluent and form a well defined zone. Length (A) 0.8 × 0.58 inches; (B) 0.8 × 0.61 inches. Another set are of a slightly paler ground colour, and the markings are fewer and larger, and are more evenly distributed over the shell. Length (A) 0.82 × 0.6 inches; (B) 0.82 × 0.6 inches.

I am unable to distinguish any difference in colour and size of two unlocalized skins in the Australian Museum collection, obtained in the southern portion of New Guinea, from typical Australian examples of this species.

Ptilotis chrysops.

YELLOW-FACED HONEY-EATER.

Sylvia chrysops, Lath., Ind. Orn. Suppl. p. liv. (1801).

Ptilotis chrysops, Gould, Bds. Aust. fol., Vol. IV., pl. 45 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 521 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 236 (1884).

ADULT MALE—General colour above ashy-brown, slightly tinged with olive, and having darker brown centres to most of the feathers; upper wing-coverts and quills brown, externally washed with olive, some of the median and greater coverts with paler tips; tail feathers brown, externally edged with olive; crown of the head like the back, but with slightly darker brown centres to the feathers; a small spot above and behind the eye, lores, and a stripe below the eye extending through the centre of the ear-coverts bright yellow; behind the ear-coverts a spot of white, which together with the yellow

stripe is bordered above and below with a line of black: chin and upper throat greyish-white, passing into ashy-brown on the lower throat, fore neck, chest, and flanks: abdomen dull white streaked with dull brown on the sides: under tail-coverts white streaked with dull brown: under wing coverts pale fulvous: bill black: legs and feet bluish-slate colour: iris bluish-grey. Total length in the flesh 6.8 inches, wing 3.2, tail 2.8, bill 0.52, tarsus 0.77.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Queensland, New South Wales, Victoria, South Australia.

THE Yellow-faced Honey-eater is freely distributed throughout portions of Queensland, New South Wales, Victoria, and South Australia. It evinces a decided preference for sapling scrubs and the contiguous mountain ranges of the coastal districts. In Victoria I found it unusually plentiful around the shores of Western Port Bay, and in far more limited numbers in the heavy undergrowth of the timber clad Strzelecki Ranges of South Gippsland. Near Sydney it is common, frequenting the parks and gardens of the city as well as those of the surrounding suburbs, where from the resemblance of the sound of its merry cheerful notes, which is usually repeated several times in succession, it is locally known as the "Chick-up"; frequently too, its note is varied with "quitch-up-quitch-up." Inland it is common on the Blue Mountains, where it may be found frequenting some of the loftiest *Eucalypti*, but I have never seen a specimen from the dry western portion of the State. Mr. A. F. Smith sent me a dried specimen for determination, that he had shot on the Bellenden Ker Range, Queensland.

From Port Augusta, South Australia, Dr. A. Chenery writes me:—" *Ptilotis chrysoptis* is not at all common here. An odd pair are generally to be seen in the Flinders Range, but I have never met with it on the plains. I found only one of their nests with eggs, and that was in 1899."

Mr. Edwin Ashby sends me the following note from Blackwood, South Australia:—"Although *Ptilotis chrysoptis* occurs here, it is more numerous on the eastern side of the range near Mount Barker. It is the earliest species to nest in that neighbourhood."

There is but little variation in adult birds obtained in different parts of the continent. The wing of an adult male obtained at Cardwell in April 1874, is 3.2 inches, which is the average measurement of birds obtained in the neighbourhood of Sydney.

Its normal food, away from the haunts of man, which is chiefly obtained among the flowering *Eucalypti*, consists of the nectar and pollen of flowers and insects. Orchardists and vigneronns however, frequently suffer as much loss through the depredations of partially insectivorous birds, as those species who depend entirely for their subsistence on fruits and berries. The Yellow-faced Honey-eater is an incorrigible eater of cultivated fruits, and does but little towards counterbalancing the damage done, by ridding the orchardist's trees of injurious insects and their larvæ. One fact, however, cannot be overlooked. As our forests of *Eucalypti* and other nectar-bearing trees are cleared, ring-barked, or destroyed by drought or bush-fires, so will birds who derived their food from these trees be driven more into those areas under cultivation, and especially into orchards and vineyards. At Port Hacking, where these birds are common, I was informed that they preyed upon the laden bees returning to the hives, but personally I did not see an instance of it, although several birds were nesting in trees in close proximity to the hives. The Dusky Wood Swallow (*Artamus sordidus*), however, was a great offender in this respect, and I saw many birds shot, while engaged in killing these industrious insects.

The nest is a neat cup-shaped structure formed of very fine dead grasses and bark-fibre, held together with a fine network of cobweb, or green mosses, the rim being securely worked over a thin forked horizontal twig. In the coastal districts it is a somewhat scanty structure, and the eggs may be frequently seen through the bottom or sides if the bird is not sitting. When built in mountain ranges the whole exterior of the nest is often thickly coated with bright green lichen, and the inside lined with the soft downy brown covering of the newly budded fronds of

ferns. Farther inland wool is also used as a building material. An average nest measures externally at the rim two inches and three-quarters in diameter by two inches in depth, the inner cup measuring two inches in diameter by one inch and three-quarters in depth. Frequently the nest is contracted at the rim by being attached to a thin acute angled fork. The position of the nest is varied, any suitable bush or tree being utilized as a nesting site. Gum saplings, tea-trees, and turpentine-trees are often resorted to in the neighbourhood of Sydney, the nest being more often built between six and twelve feet from the ground, and sometimes in a thick drooping branch of a turpentine or gum sapling at a height of three or four feet. At Port Hacking I saw them in narrow-leaved gum trees as high as forty feet, two nests with the birds sitting being found in the same tree. In parks and gardens, pines are chiefly resorted to, while at Western Port, Victoria, I found as many as seven tenanted nests in an afternoon, built in prickly *Acacia* hedges around gardens. In mountain ranges it is built in any suitable tree in the undergrowth. The nest figured, taken by Mr. S. Robinson, near Bathurst, in December 1895, is a remarkably pretty one. It is suspended to a thin forked horizontal branch of a briar-bush, the rim and outer portion of the structure being constructed of pure white lamb's wool intermingled with very fine bright green mosses, and the inside lined with thin yellowish-white rootlets.



NEST OF THE YELLOW-FACED HONEY-EATER.

The eggs are two or three in number for a sitting, and are subject to considerable variation in the colour, character and disposition of their markings. Typically, they vary in ground colour from a faint reddish-white to a yellowish-buff, which is either freckled or spotted with light red, chestnut-red, or purplish-brown, intermingled with a few underlying markings of lilac or purplish-grey. Usually specimens that are freckled, have the markings distributed all over the shell, but predominating on the thicker end, and as in the spotted or blotched specimens they

frequently form a cap or zone. A rare variety has the ground colour almost pure white, which is spotted and blotched, but particularly on the larger end with dark purplish-red, resembling a variety of the eggs of *Ptilotis penicillata*. A set of three, taken at Chatswood, on the 21st August, 1898, measures:—Length (A) 0·83 × 0·57 inches; (B) 0·84 × 0·58 inches; (C) 0·83 × 0·58 inches. A set of three taken at Canterbury, on the 22nd December, 1894, measures:—Length (A) 0·8 × 0·63 inches; (B) 0·79 × 0·63 inches; (C) 0·8 × 0·62 inches.

In the neighbourhood of Sydney the normal breeding season of this species commences distinctly later than that of either of its congeners *Ptilotis auricomis*, and *P. fusca*. Odd nests may however, occasionally be found at the latter end of July or early in August, but nests with fresh

eggs are more plentiful in September, young birds being common in October and January. At Eastwood I found nests with fresh eggs on the 1st January, and two days later one with young recently hatched, at Canterbury, the breeding season usually extending into the first week in February. Mr. S. W. Moore found at Eastwood, three nests of the Yellow-faced Honey-eater on the 14th January, two containing two eggs in each, the other three eggs.

The eggs of the Pallid Cuckoo, are frequently deposited in the nests of the Yellow-faced Honey-eater. Mr. S. W. Moore on the 4th December, 1891, also found at Haslem's Creek, an egg of the Square-tailed Cuckoo, in the nest of this species.

Ptilotis fusca.

FUSCOUS HONEY-EATER.

Meliphaga fusca, Gould, Syn. Bds. Austr., Pt. II., (1837).

Ptilotis fusca, Gould, Bds. Austr., fol., Vol. IV., pl. 44 (1848).

Ptilotis fusca, Gould, Handbk. Bds. Austr., Vol. I., p. 520, (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 229, (1884).

ADULT MALE—*General colour above greyish-brown, slightly tinged with olive, becoming paler on the rump and upper tail-coverts: upper wing-coverts slightly darker than the back, the greater series washed with olive-yellow; quills dark brown, externally margined with olive-yellow, the apical portion of the outer webs of the primaries having narrow ashy-white edges; tail-feathers brown, narrowly edged at their tips with dull ashy-white, the central pair and outer webs of the remainder strongly washed with olive-yellow; forehead, crown, and sides of head greyish-brown, slightly tinged with olive; around the eye a ring of small blackish-brown feathers: ear-coverts greyish-brown tinged with olive, some of the longer feathers tipped with dark brown, which is followed by a small patch of pale yellow plumes; chin, throat, fore neck and breast greyish-brown, with broad but very pale fulvous margins, and passing into a dull fulvous-white on the abdomen and under tail-coverts: under wing-coverts fulvous; bill black; legs and feet fleshy-grey: iris black. Total length in the flesh 6.2 inches, wing 3.25, tail 2.75, bill 0.85, tarsus 0.75.*

ADULT FEMALE—*The sexes are alike in plumage.*

Distribution—Queensland, New South Wales, Victoria.

THE range of the Fuscous Honey-eater extends over the southern half of Queensland, the whole of New South Wales, except the dry western portions of the State, and the greater part of Victoria. It is a common species in the neighbourhood of Sydney, where it is resident throughout the year, and is tolerably numerous in the open forest country adjoining the large open plains in the western portion of the State. Near the coast it may be found frequenting the same situations as *Ptilotis auricomis*, but it gives preference more to open forest lands. After a heavy thunderstorm in summer I have occasionally seen these birds taking a bath in a wheel rut on the road side.

Its food consists of nectar extracted from various flowers, and insects. During the winter months I have seen numbers of these birds in company with *Melithreptus lunulatus* and *Trichoglossus pusillus*, so busily engaged in extracting nectar from the blossom of a Stringy-bark tree that repeated firing into the tree and the killing of their companions failed in any way to disturb them. At Middle Harbour they may often be seen feeding on the long flowering stalks of grass trees. It is of an extremely tame and sociable disposition. When living at Ashfield, small flocks of these birds during the winter months used to congregate regularly near the back door of our house to be fed on bread crumbs. Should there not have been any bread on the

ground for them, they quickly let one know of their presence by their loud chirruping notes, which they continued to utter until their wants were supplied. On the 2nd August, 1891, I counted no less than fifteen engaged in eating some pieces of bread thrown to them. So tame did they become that they would allow one to approach within a few feet before flying away. One of these birds that could be easily recognised by having a bare scalp, visited the place with slight intermissions for three years, returning with its young, as did others after each breeding season was over.

The nest is a small, open, neat cup-shaped structure, and is usually built at the junction of a thin forked horizontal branch, over which the rim is firmly woven. In the neighbourhood of Sydney it is externally formed of thin strips of the red inner bark of a Turpentine tree or Eucalyptus, held together with cobweb and lined inside with fine dried grasses, and at the bottom with opossum fur and cow-hair. An average one measures externally two inches and a half in diameter by two inches in depth, and the inner cup two inches in diameter by one inch and three-quarters in depth. Generally it can be distinguished from the nests of any other member of the genus, even from the ground, by its extreme neatness and the prevailing dull red colour of the bark used almost exclusively in its outer construction.

Nests taken by Mr. E. H. Lane on Wambangalang Station, near Dubbo, are formed throughout of fine wiry grasses with a slight admixture of wool just sufficient to bind it firmly together, with a lining of the latter material at the bottom of the structure only. In the neighbourhood of Sydney the nest is usually built in a Turpentine tree or Eucalyptus at a height varying from ten to sixty feet from the ground, and as a rule well out of the way of bird-nesting boys, consequently they do not fall an easy prey like those of *Ptilotis auricomis*. Mr. E. H. Lane informs me that on Wambangalang Station he has found about a score of nests of *Ptilotis fusca*, and they were generally built in suckers growing from ring-barked Box trees at a height of from four to twelve feet from the ground. With the exception of once finding only two eggs, all contained three eggs.

The eggs are two or three in number for a sitting, oval in form, the shell being close grained, smooth and lustreless. They vary in ground colour from a yellowish to a rich salmon-buff, and are faintly and sparingly spotted and dotted with dull chestnut-red, but specimens are often found with the markings of only a slightly darker shade of the ground colour. Typically they may be distinguished from the eggs of most other species of the genus by the rich hue of their ground colour. A set of two taken at Ashfield on the 4th August, 1889, measure:—Length (A) 0.78 × 0.57 inches; (B) 0.76 × 0.58 inches. A set of two taken by Mr. H. G. Barnard, at Duarina, Queensland, on the 17th July, 1892, measures:—Length (A) 0.75 × 0.57 inches; (B) 0.72 × 0.56 inches. A set of three taken by Mr. E. H. Lane, at Wambangalang Station, near Dubbo, New South Wales, on the 27th October, 1898, measure as follows:—Length (A) 0.81 × 0.57 inches; (B) 0.8 × 0.57 inches; (C) 0.79 × 0.6 inches.

July and the five following months constitute the usual breeding season of this species. On the 24th July, 1891, at Ashfield, I saw one of these birds tearing off shreds of the inner bark of a Turpentine tree and constructing its nest in the topmost leafy twigs of a lofty Eucalyptus. The previous year I found a nest in a similar position, as late as the 27th December, and have seen fledgelings that had recently left the nest at the beginning of February.

Mr. E. H. Lane has on several occasions at Wambangalang, found the egg of the Pallid Cuckoo in the nest of this species.

There is almost a pure albino of the Fuscous Honey-eater in the Australian Museum collection, procured by Mr. Stanley F. Ramsay at Tumberumba, New South Wales. The plumage above and below is pure white, the ocular region and ear-coverts yellow, the wings and tail washed with yellow.

Ptilotis sonora.

SINGING HONEY-EATER.

Ptilotis sonorus, Gould, Proc. Zool. Soc., 1840, p. 160; *id.*, Bds. Austr., fol., Vol. IV., pl. 33 (1848).

Ptilotis sonora, Gould, Handbk., Bds. Austr., Vol. I., p. 504 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 234 (1884).

ADULT MALE—*General colour above brown, washed with olive and passing into a greyish-brown on the crown of the head and forehead; wings brown, the outermost upper wing-coverts washed with olive-yellow, the outer webs of the primaries narrowly edged, and the secondaries margined with olive-yellow; tail feathers brown, margined externally with olive-yellow; lores, feathers around the eye, and extending in a broad streak behind the eye down on to the sides of the neck, black; upper portion of cheeks pale yellow passing into bright yellow on the ear-coverts, behind which is a patch of silky-white feathers, succeeded by a much larger greyish-white patch; chin and throat dull yellowish-white; remainder of the under surface dull yellowish-grey, each feather having an ill-defined longitudinal streak of pale brown, the fore neck being more distinctly tinged with yellow; centre of the abdomen and under tail-coverts whitish-brown, with narrow darker shaft streaks. Total length in the flesh 7.5 inches, wing 3.6, tail 3.8, bill 0.6, tarsus 0.95.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia.

THE Singing Honey-eater is found over nearly the whole of Australia. There are specimens in the Australian Museum collection from all parts of the continent, except Eastern Victoria, the coastal districts of New South Wales, and the extreme northern portions of the Northern Territory of South Australia. In a species so generally distributed, it is not remarkable that individual and climatic variation exists to a considerable extent, and yet not sufficient and constant enough to merit specific distinction. One of the largest adult males in the collection, and with the most distinctly streaked under surface is a specimen obtained by Mr. George Masters at Port Lincoln, South Australia, in November 1865; wing 3.9 inches. The wing-measurement of this specimen is equalled by an adult male procured by the late Mr. K. H. Bennett, in July 1883, on Coombi Station, New South Wales, but on the latter example the brown streaks are less distinct on the breast. Other adult males obtained in New South Wales have the under surface dingy-white, not pale yellowish-grey, but similarly streaked with pale brown; an adult male I shot at Moree in November 1867, has the lightest coloured under surface of any specimen in the collection, being a faint creamy-white, tinged with yellow on the fore neck and having narrow indistinct streaks on the sides of the breast. This bird was in the moult and has two new tail feathers, the others being worn and abraded; wing 3.5 inches. Adult males from the Herbert River, and the Gulf of Carpentaria, Queensland, are similar to others obtained at Derby North-western Australia; wing 3.3 inches. Considerable variation exists in the width of the black streak on the sides of the neck, and the size of the white or greyish-white patch of feathers behind, and in some instances also below the ear-coverts. The most remarkable plumaged adult male is one procured near Adelaide in 1863. This specimen has the tail feathers, also some of the quills conspicuously margined with reddish-olive; wing 3.65 inches. A number of mounted specimens in the Australian Museum collection were obtained by Mr. George Masters at King George's Sound, Western Australia.

It is remarkable that in New South Wales it is strictly an inland species, while in the other States, it occurs on the sea coast, as well as in the interior portions. I met with it on the Namoi and Gwydir Rivers, my attention in the latter locality being directed to it by its loud notes,

uttered from the tops of lofty pines. Later on I heard the notes of this species in the shrubs on the sand-hills at Henley Beach near Adelaide.

The late Mr. K. H. Bennett, wrote as follows while resident at Mossgiel, New South Wales:—*Ptilotis sonora* is without doubt the most common Honey-eater of this part of the country, being equally numerous in the clumps of timber and sand-hills dotted over the plains. Its food besides nectar of flowers and insects, consists largely of the berries of various plants. As Gould remarks, the structure of the nest varies in different situations, usually they are round, cup-shaped and somewhat scanty structures of dried wiry grasses matted and held together with spiders' webs, and lined inside with fibrous roots. The site chosen for the nest is amongst the thick twigs of some scrubby bush or small tree. The eggs are two or three in number for a sitting and the breeding season here is in September and October."

Mr. Edwin Ashby sent me two specimens for examination and wrote me:—" *Ptilotis sonora* does not occur in the ranges near Adelaide but is very common in the coastal sand-hills within six miles of the city. The female is one I obtained at Siberia Soak, a locality about sixty miles to the north of Coolgardie, Western Australia."

From Port Augusta, Dr. A. Chenery sends me the following note:—" *Ptilotis sonora* is common here all the year round. I have also seen it everywhere in the interior where I have been. It eats insects as do other Honey-eaters, and builds in myalls or sandal-wood, also sometimes in orchards."

Mr. G. A. Keartland writes me:—" Few birds are found in such varied country as the Singing Honey-eater, *Ptilotis sonora*. They are equally at home amongst the shrubs on the sea-coast of South Australia and Victoria, in the *Casuarina* ridges of the Werribee Plains, between Melbourne and Geelong, the sand dunes at Geraldton, Western Australia, the sand-hills of portions of the Great Desert in North-western Australia, and the mulga scrubs and open forests of Central Australia. Wherever found they were generally seen singly or in pairs. While crossing the Great Sandy Desert of North-western Australia in September, 1896, I found several of their nests, but in most of them only one partly incubated egg was found in each. Near Derby in May, 1897, I shot as many birds as I wanted, by sitting near one of the many trees that were then in full bloom. Why this bird is called the Singing Honey-eater I cannot tell, I never heard it utter more than a few notes."

Mr. J. Gabriel sends me the following note:—" In company with Mr. G. A. Keartland a nest was found of *Ptilotis sonora* on the Werribee Plains, Victoria, on the 23rd October, 1893, with three fresh eggs. The cup-shaped nest of grasses and wool was placed in the drooping needle-like leaves of an outlying branch of a *Casuarina* not more than seven feet from the ground. Unfortunately two of the eggs were drawn out of the nest by the bird when flushed and the eggs broken. A fortnight later we found another nest with three fresh eggs, under almost the same conditions. We found a third nest in the following season, but although I have many times since visited the plains, I have never seen any of these birds."

Dr. A. M. Morgan who accompanied Dr. A. Chenery in July and August 1900, on a trip from Port Augusta to the Mount Gunson District, South Australia, writes me:—" *Ptilotis sonora* was very common, and seems to be an irregular breeder, as we found a nest building on the 30th July, 1900, another about completed on the 3rd August, and one on the same day contained half-grown young ones. Another on the 10th August built in the mistletoe of a myall growing in the bed of a creek, with two heavily incubated eggs. I saw another in Gibson's camp with incubated eggs in it, which the owner said had been taken six weeks before, and another nest at Port Augusta contained a sterile egg and one in an advanced stage of incubation. It was built in the top of a large salt-bush growing in a creek. I have met with *Ptilotis sonora* from Henley Beach in the south to Mount Gunson in the north, and Yardea in the west, and found its eggs,

commonly two in number, but three is not unusual, in every month from July to January. The nest has always, in my experience, been built in a thick bush very well concealed and only once have I seen it out of reach of the hand."

In 1905 at Laverton, Western Australia, Mr. Chas. G. Gibson, informs me that he found six nests. Two each on the 28th and 31st July, and two on the 6th and 11th August. They were built in mulga or low bushes at a height varying from four to five feet from the ground. Five of the nests each contained two fresh eggs, the other, two eggs slightly incubated.

A nest taken on the 19th October, 1899, by Dr. A. M. Morgan at Henley Beach, near Adelaide, is externally very irregularly formed of dried plant stems and grasses, thickly matted together with the web and egg-bags of spiders, the inside being lined with very fine fibrous roots and horse-hair, through which is interwoven bits of cotton and soft fibrous string. External average measurement four inches, depth three inches; internal diameter two inches and a quarter, depth one inch and a half. It was built about five feet from the ground, in the hanging branches of a *Banksia*, one side of the nest being attached to a thin stem and partially resting on a cone, and the other to the stem of a climbing plant.

The eggs are two or three in number, oval in form, the shell being close-grained, smooth and more or less lustrous. In ground colour they vary from faint fleshy-white to a light yellowish or a reddish-buff, and generally have a zone or cap of a darker shade of the ground colour on the larger end, where occasionally are a few small spots of a still deeper hue. A set in the Australian Museum collection, taken in 1898, by Dr. W. A. Angove, between Dry Creek and Salisbury, South Australia, measures as follows:—Length (A) 0·83 × 0·61 inches; (B) 0·87 × 0·6 inches; (C) 0·89 × 0·61 inches. A set of two taken by Mr. Edward Lord Ramsay on the 9th October, 1899, at Wilgaroon, Western New South Wales, vary in colour, one being of a yellowish-buff ground colour with a cap of reddish-buff, the other is almost pure white with a broad penumbral band of rich reddish-buff on the larger end, a faint shade of this colour spreading over the top of the thicker end. Length (A) 0·95 × 0·6 inches; (B) 1 × 0·62 inches. These eggs, which were nearly hatched, were taken from a cup-shaped nest built of pieces of a thin green vine, in an Emu-bush, at a height of six feet from the ground. A set of three taken by Dr. A. M. Morgan on the 19th October, 1899, are lighter in colour than average specimens being of a very delicate flesh colour with an almost imperceptible darker shade on the larger end of the shell. These eggs could easily be mistaken for those of a variety of the Yellow-tufted Honey-eater, or small eggs of the Pallid Cuckoo. They measure:—Length (A) 0·9 × 0·65 inches; (B) 0·91 × 0·66 inches; (C) 0·92 × 0·66 inches.

July and the five following months constitutes the usual breeding season of this species, but in Central Australia. Mr. C. E. Cowle has obtained fresh eggs in March.

Ptilotis versicolor.

VARIED HONEY-EATER.

Ptilotis versicolor, Gould, Proc. Zool. Soc., 1842, p. 136; *id.*, Bds. Austr., fol., Vol. IV., pl. 34 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 506 (1865); Salvad., Orn. Pap. et Molucc. Pt. II., p. 344 (1884); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 234 (1884); North, Vict. Nat., Vol. XXI., p. 167 (1905); *id.*, Rec. Austr. Mus., Vol. VI., p. 29 (1905).

ADULT MALE—*General colour above dull yellowish-olive; most of the feathers on the back having dark brown centres; wings brown washed with yellowish-olive, which is brightest on the outer webs of the outermost primaries; tail feathers brown, washed with olive-yellow, more distinctly on the outer webs; crown of the head like the back, passing into a greyish-brown on the forehead; lores, feathers*

around the eye, and extending in a broad streak behind the eye down on to the sides of the neck black; upper portion of cheeks pale yellow, passing into bright yellow on the ear-coverts, behind which is a patch of silky-white feathers, followed by a much larger greyish-white patch; all the under surface yellow, paler on the chin and upper throat, brighter on the fore neck, all the feathers with a distinct longitudinal streak of brown; vent and under tail-coverts faint yellowish-white with narrow brown shaft-streaks: "bill black; legs and feet dark grey; iris brown" (Smith). Total length 7.75 inches, wing 4.1, tail 3.6, bill 0.7, tarsus 1.1.

ADULT FEMALE—Similar in plumage to the male, but slightly smaller. Wing 3.8 inches.

Distribution—Coastal districts of Northern Queensland, Islands of Torres Strait, South Coast of New Guinea and contiguous islands.

THE present species which inhabits the coastal districts of Northern Queensland and the adjacent islands, also similar situations in the south of New Guinea, was described by Gould in 1842.* from a single specimen contained in a collection from the northern portion of Australia. It is beautifully figured by him in his folio edition of the "Birds of Australia,"† and there he remarks:—"It is one of the finest species yet discovered of the genus to which it belongs, and is at present so rare, that my own specimen is probably the only one brought to Europe." During the "Voyage of the Rattlesnake," Mr. John MacGillivray obtained this species on the 31st May, 1848, on Dunk Island, and Mr. M. Elsey also procured it on Albany Island in September, 1855. Many specimens were obtained in 1875 during the "Voyage of the Chevert," fitted out by the late Sir William Macleay. Mr. George Masters records‡ four males and four females obtained at Cape Grenville, one female Barrow Island, one male and one female Long Island, three males and one female Dungeness. In the Australian Museum collection, this species is represented by specimens obtained at Salt-water Creek near Cardwell in May, 1874 and October, 1877, an adult male and female procured by Mr. A. F. Smith on one of the Frankland Islands, on the 16th October, 1904, and others from the south coast of New Guinea, Samarai and Dinner Islands procured by Dr. MacKinlay of H.M.S. "Swinger." Mr. Frank Hislop informs me that he has noted this species on the Hope Islands, lying off the coast of North-eastern Queensland.

The Varied Honey-eater is closely allied to *Ptilotis sonora*, Gould, and from which it may be chiefly distinguished by its larger size, and richer coloured plumage, the general character of the markings of the two species being nearly alike. There is the same variation to be found in depth of colour and the extent of the white or greyish-white patch on the sides of the neck as in *P. sonora*. Typically specimens from Cardwell are of a slightly richer yellow on the under parts than examples from the south coast of New Guinea and the adjacent islands.

Among a small collection of bird skins sent me for examination, made by Mr. A. F. Smith, principally near Cairns, North-eastern Queensland, and the neighbourhood, was a specimen of *Ptilotis versicolor*, Gould, collected by him on one of the Frankland Islands, on the 16th October, 1904. Subsequently I received a second specimen from him, shot in company with the other, also their nest and a set of two eggs taken at the same time.

The nest figured is a cup-shaped and somewhat scanty structure, daylight being visible through the greater portion of the sides. Externally it is formed of fibrous rootlets, held together with plant down and spider webs, with which are intermingled a few egg-bags of spiders and their green silky covering, the inside being sparingly lined with fine pale brown rootlets and

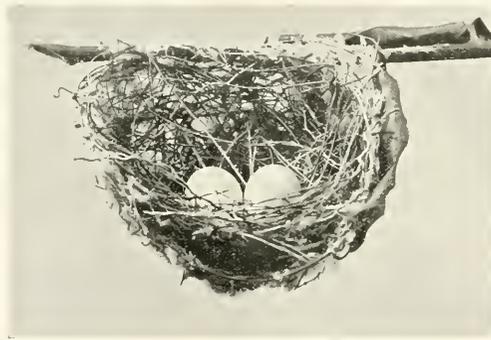
* Gould, Proc. Zool. Soc., 1842, p. 136.

† Gould, Bds. Austr., fol. ed., Vol. IV., pl. 34, (1848).

‡ Proc. Linn. Soc. N.S. Wales, Vol. I., p. 55 (1876).

fibre, and at the bottom with a small quantity of silky-white plant-down. It is attached by the rim on one side to a leafy horizontal branch from which springs a thin twig at right angles, but this is concealed in the structure, two leaves being worked on to the side of the nest. Externally it measures three inches and three-quarters in diameter by two inches and a quarter in depth, the inner cup measuring three inches in diameter by one inch and a half in depth.

The eggs, which were in an advanced state of incubation, are two in number, oval in form, somewhat pointed at the smaller end, the shell being close-grained, smooth and lustrous. They are of a uniform fleshy-buff colour, being of a slightly richer shade on the larger end, where on one specimen, with the aid of a lens, a few very minute darker dots may be seen. The eggs of this species are indistinguishable in colour from a variety of those of its close ally the Singing Honey-eater, also from those of the Pallid Cuckoo. Length (A) 0·96 × 0·7 inches; (B) 0·94 × 0·68 inches.



NEST AND EGGS OF THE VARIED HONEY-EATER.

Relative to taking this nest and set of eggs, Mr. Smith has kindly supplied me with the following notes:—"This species is fairly plentiful on one of the Frankland Islands off the coast of North-eastern Queensland. It has a loud call that attracted my attention as our boat drew near the island, as something quite different to anything I had heard before, but cannot describe it very well, it is a clear musical whistle of four or five notes. The nest was built in a tree on the edge of the scrub which covers half the

island, and about ten yards from the beach. It was seven feet from the ground, and attached to thin upright twigs on one side, and the horizontal branch on the other side which remains fastened to the nest. It contained two eggs very much incubated, and while I was taking them the pair of birds perched on a tree alongside and uttered their loud cries. I brought both down with one shot without damaging either as specimens." Writing later, Mr. Smith remarks:—"I visited the Frankland Islands again on the 29th October, 1905, and shot an adult male of *Ptilotis versicolor*. I saw two pairs of adults feeding large young well able to fly about, but did not see any nests, probably it was too late." Mr. Smith has also observed this species inhabiting private gardens about Cairns.

Ptilotis macleayana.

MACLEAY'S HONEY-EATER.

Ptilotis versicolor?, Ramsay, Proc. Zool. Soc., 1868, p. 386.

Ptilotis macleayana, Ramsay, Proc. Linn. Soc. N.S.W., Vol. I., p. 10 (1875); North, Proc. Linn. Soc. N.S.W., Vol. XXIII., p. 380 (1898).

Ptilotis flavostrata, Gould, Proc. Zool. Soc., 1875, p. 316; *id.*, Bds. New Guin., Vol. III., pl. 50 (1876).

Ptilotis flavostrata, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 232 (1884).

ADULT MALE.—General colour above dark brown washed with olive, the mantle and back with a triangular shaped ochraceous mark towards the tip of each feather, on some on the outer web only; rump and upper tail coverts dark olive-brown, the former indistinctly centred and the latter margined with dull olive-yellow; upper wing-coverts brown externally washed with dull olive-yellow and having a triangular shaped yellowish-white mark at the tip; quills brown externally margined with pale olive-yellow, tail feathers brown externally margined with dull olive-yellow, their inner webs and tips narrowly edged with pale brown; forehead and crown of the head blackish-brown, all the feathers tinged with olive except on the sides of the occiput, which is black; hind neck dull blackish-brown, each feather having a triangular shaped whitish mark at the tip; around the eye a large bare space; five plumes partially concealing the ear-opening whitish; below and extending behind it, a conspicuous tuft of bright golden yellow feathers; a narrow line on the cheeks olive-brown with indistinct yellowish bases to most of the feathers; chin and throat greyish-white tinged with olive; fore neck and upper breast dull olive-yellow, each feather narrowly streaked down the centre with bright yellow, those on the upper breast being more distinctly washed with yellow; remainder of the under surface dull oliveaceous-green, the feathers on the centre of the lower breast having whitish centres, and their basal portion a conspicuous broad streak of blackish-brown; abdomen dull oliveaceous-green, indistinctly streaked with dull olive-yellow; under tail-coverts creamy-white tinged with olive; bill black; legs and feet grey; iris dark brown, nearly black, bare space below and behind the eye yellow" (Smith). Total length 7 inches, wing 3.5, tail 3.1, bill 0.85, tarsus 1.

ADULT FEMALE.—Similar in plumage to the male.

Distribution—North-eastern Queensland.



MACLEAY'S HONEY-EATER.

THE original description of the present species formed the subject of the first paper read by Dr. E. P. Ramsay, at the inaugural monthly meeting of the Linnean Society of New South Wales, held on the 25th January, 1875, the description appearing in the first part of the Society's Proceedings, published on the 27th April following.^{*} Gould also described it later on in the same year, under the name of *Ptilotis flavostriata*, in the Proceedings of the Zoological Society, his description of it being published in Part II., on the 1st August, 1875.[†]

Relative to *Ptilotis macleayana*, Dr.

Ramsay in his original description remarks:—"This fine species of *Ptilotis*, which I propose naming in honour of our distinguished President, is closely allied to *Ptilotis versicolor*, of Gould's 'Birds of Australia,'[‡] differing somewhat in the general markings, but chiefly in the absence of the white patch behind the ear-coverts and the black and yellow markings on the side of the head. The bird is about the same in size and curiously enough has every appearance of being a young bird, so much so, that although I have been acquainted with this bird for some time, I deferred describing it until several male specimens were obtained. In some notes sent to the Zoological Society of London,[§] I erroneously entered it as the young of *Ptilotis versicolor*?

* Proc. Linn. Soc. N.S.W., Vol. I., part i., p. 10, 27th April (1875).

† Gould, Proc. Zool. Soc., 1875, part II., p. 316, 1st August.

‡ Gould, Bds. Austr., Vol. IV., pl. 34 (1848).

§ Proc. Zool. Soc., 1868, p. 386, sp. 25.

Gould. I have since, however, through the kindness of Mr. Macleay, been enabled to examine several fine specimens obtained by his collector Edward Spalding, near Cooktown, and have no doubt whatever of it being a fully adult bird of a distinct species. The original specimen referred to in my 'List of Birds from Rockingham Bay,' was obtained by Spalding near Cardwell, and was the only one seen during his stay in that locality; during my last natural history excursion to those parts I was fortunate enough to obtain three others on the Herbert River, some thirty miles south of Cardwell. It is a quiet retiring species in habits, resembling *Ptilotis lewini* and frequents the scrubs and brushes fringing the Herbert River. Its note is a feeble cry resembling that of *Ptilotis chrysops*. The young assume the plumage of the adult at an early stage. This species, as far as it is yet known, has a very limited range, being confined to the brushes and scrubs of the east coast from the Herbert River to Cooktown, on the Endeavour River.* Subsequent research has only extended the distribution of this species to some of the higher peaks of the Bellenden Ker Range.

In the "Catalogue of Birds in the British Museum." this species appears under Gould's later name of *Ptilotis flavistriata*. As it was subsequently found, Dr. Ramsay was quite correct in the "Proceedings of the Zoological Society of London," in placing a query against this species being the young of *Ptilotis versicolor*. It is difficult to understand though, how Dr. H. Gadow,† after Dr. Ramsay's careful description of *Ptilotis macleayana* and his remarks thereon, could erroneously place *Ptilotis macleayana* as a synonym of *Ptilotis versicolor*.‡

Gould's figures of this species in his "Birds of New Guinea," under the name of *Ptilotis flavostriata*,‡ are too highly coloured and the markings are too symmetrical. The triangular shaped mark at the tips of the feathers of the hind neck and mantle do not follow one another down in straight lines, nor are the under parts so distinctly streaked with yellow as is there represented.

Collecting on behalf of the Trustees of the Australian Museum, Messrs. E. J. Cairn and R. Grant obtained some fine examples of this species at Boar Pocket and on some of the higher peaks of the Bellenden Ker Range.

Mr. Frank Hislop writes me as follows:—"Macleay's Honey-eater is generally met with in the scrub in the Bloomfield River District, all the year round, but I have never found its nest. The food of this Honey-eater consists chiefly of insects and small wild fruits."

With a skin sent from Hambleton near Cairns, Mr. A. F. Smith, writes as follows:—"I shot this bird on the 2nd September, 1905, while feeding among the blossom of a scrub tree, and saw several of them in different places about the same time. Their food consists of small wild fruits and berries. They are very quiet and I have not heard them utter a sound."

A nest taken by Mr. J. A. Boyd from a *Mango* tree near the Herbert River on the 16th December, 1896, is a deep cup-shaped structure, slung by the rim to a thin forked horizontal branch. It is composed chiefly of cocoa-nut fibre, with which is intermingled on the lower portion a few small broad leaves, skeletons of leaves, the outer covering from the stem of a *Musa* and the paper-like bark of a *Melaleuca*, and some egg-bags of spiders. In the lining which is composed entirely of cocoa-nut fibre are two feathers from the lower portion of the breast of *Ptilotis macleayana*, and evidently detached from the female while sitting. Externally it measures three inches and a quarter in diameter by four inches in depth; internally two inches and a quarter in diameter by two inches and a half in depth.

The eggs from the above nest are two in number, oval in form, the shell being close-grained, smooth and slightly lustrous. They are of a pale fleshy-buff ground colour, sprinkled over with numerous distinct but very minute dots and freckles of chestnut-red, which are darker and

* Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 232 (1884). † *Loc. cit.*, p. 235 (1884).

‡ Gould, Bds. New Guinea, Vol. III., p. 50 (1876).

more thickly disposed on the larger end, where are intermingled a few underlying markings of dull violet-grey. Length (A) 0.92 × 0.67 inches; (B) 0.9 × 0.67 inches.

From a notesent me by Mr. E. H. Webb, I have extracted the following:—"I found a nest about half built of *Ptilotis macclayana* on the 20th September, 1903, at Goondi, on the Johnstone River, and visited it again on the 3rd October when it was apparently ready for eggs. The following week I found the female, which I subsequently procured, sitting on two partially incubated eggs. The nest, a deep cup-shaped structure formed of withered leaves and fan-palm fibre, was placed about ten feet up in a thick bushy tree, and attached rather loosely by the rim to three separate twigs."

Immature birds resemble the adults but are duller in colour, there is only a slight indication of the whitish tips to the feathers on the hind neck, and the remainder of the markings on the upper parts are less distinct; on the under parts the feathers on the fore neck and upper breast are almost a uniform dull olive-yellow and destitute of the narrow yellow central streaks. Wing 3.2 inches.

The breeding season it will be seen by the above quoted dates, commences in September and continues during the three following months.

Ptilotis frenata.

BRIDLED HONEY-EATER.

Ptilotis frenata, Ramsay, Proc. Zool. Soc., 1874 p. 603; Gould, Bds. New Guinea, Vol. III., pl. 49 (1876); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 231 (1884); North, Rec. Austr. Museum, Vol. II., p. 15, pl. iii. (1892).

ADULT MALE—*General colour above dull brown, becoming darker on the hind neck and crown of the head; upper wing-coverts, primary coverts and quills brown externally margined on their outer webs with dull olive, these margins being broader and more distinct on the secondaries; tail feathers brown, externally edged with dull olive: lores, feathers in front and a narrow half ring of feathers below the eye blackish-brown, followed by a bare space extending below and behind the eye; feathers on the upper portion white with blackish-brown tips; cheeks blackish-brown and gradually passing into black on the hinder portion of the ear-coverts, above which is a small tuft of bright golden-yellow feathers: on the sides of the neck a large triangular shaped patch of light greyish-brown feathers, those next the ear-coverts being washed with yellow; chin and sides of the throat dull brown, the latter separated from the cheeks by an indistinct line of dull yellow feathers, which broadens out where they meet on the centre of the throat: fore neck brown and gradually passing into a greyish-brown on the remainder of the under surface; under tail-coverts greyish-brown with whitish margins; "bill blackish, the basal half except on the culmen, yellow; legs and feet greyish-blue; iris slate colour" (Smith). Total length 8 inches, wing 4, tail 3.6, bill 0.7, tarsus 1.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-eastern Queensland.

THIS very distinct species was described by Dr. E. P. Ramsay in 1874 from specimens obtained by Mr. K. Broadbent near Cardwell. Collecting on behalf of the Trustees of the Australian Museum in 1888-9, Messrs. E. J. Cairn and R. Grant secured a number of specimens, both near Cairns and on the higher peaks of the Bellenden Ker Range. There are also examples in the Australian Museum collection obtained by the late Mr. W. S. Day at Boar Pocket, and by Mr. A. F. Smith at Hambleton, near Cairns. The latter writes me:—"Ptilotis

frenata appears in numbers during winter, principally on the hill-sides where it frequents the forest trees on the edge of the scrub; I have never seen it in summer. Honey-eaters and many other species are usually far more plentiful about Hambleton in winter than in summer. It may be that numbers of birds come down from the table-land in winter to get away from the cold of that region and return to breed."

The wing-measurement of adult specimens in the Australian Museum collection varies from 3·85 to 4·2 inches.

Relative to this species farther north, Mr. Frank Hislop writes me:—"The Bridled Honey-eater is found in the Bloomfield River District about the tops of the high mountain ranges. I have never seen it in the scrubs or in the low lying country near the coast." Mr. Bertie Hislop who was resident for some time near Cooktown, informed me that he never met with this species in the scrubs of the Endeavour River.



NEST AND EGGS OF THE BRIDLED HONEY-EATER.

one inch and six-tenths in depth. This nest which contained two partially incubated eggs, and from which the parents were procured, was placed about three feet from the ground, on a mass of creepers growing over a small shrub. It is built of stronger materials than is generally used by the species of this genus.

The eggs from the above nest are oval in form, tapering gently to the smaller end, the shell being close-grained, smooth and almost lustreless. They are dull white, with minute dots and rounded markings of purplish-black and purplish-grey, the latter colour appearing as if beneath the surface of the shell. As usual, the markings predominate on the thicker ends, where in places they are confluent forming there small irregular zones; over the remainder of the shell they are larger and more sparingly dispersed in one specimen, on the other they are evenly distributed. Length (A) 0·93 × 0·65 inches; (B) 0·95 × 0·65 inches. These eggs are unlike those of typical specimens of the genus *Ptilotis*, and approach nearer in colour and disposition of their markings to those of *Certhionyx variegatus* and *Artamus sordidus*.

A nest in the Australian Museum collection, obtained by the late Mr. W. S. Day at Boar Pocket, near Cairns, on the 28th November, 1891, and here figured, is a cup-shaped structure, outwardly composed of long pliant stems of a climbing plant and portions of soft reddish-brown stems of a small fern; inside it is neatly lined with a white wiry-looking vegetable fibre, forming a strong contrast to the reddish-brown hue of the exterior; it measures externally four inches and a half in diameter by two inches and six-tenths in height, the inner cup measuring two inches and a half in diameter by

Ptilotis flavigularis.

YELLOW-THROATED HONEY-EATER.

- Meliphreptes flavicollis*, (with *M. flavigula*, Viell.), *Nouv. Dict. d'Hist. Nat.*, tom. XIV., p. 325 (1817) (*teste* Gadow).
- Ptilotis flavigula*, Gould, *Proc. Zool. Soc.*, 1838, p. 24; *id.*, *Bds. Austr.*, fol., Vol. IV., pl. 35 (1848); *id.*, *Handbk. Bds. Austr.* Vol. I., p. 508 (1865).
- Ptilotis flavigularis*, Gadow, *Cat. Bds. Brit. Mus.*, Vol. IX., p. 239 (1884).

ADULT MALE—*General colour above including the wings and tail rich olive-yellow, inner webs of the quills brown; forehead, crown, sides of head and the nape dark steel-grey, the basal portion of the feathers with blackish centres; a broad loreal streak, a narrow line of short feathers around the eye and the cheeks, blackish; upper portion of ear-coverts silky-grey, the lower portion blackish, behind which is a small tuft of pale yellow plumes; chin and throat gamboge yellow; fore neck, chest, breast and abdomen dark steel-grey washed with dusky-olive, and passing into a dull olive-yellow on the centre of the lower breast and abdomen: under tail coverts dull olive-yellow with pale yellow margins; thighs rich olive-yellow; edge of wing and axillaries gamboge-yellow; bill black; legs and feet grey, soles of latter dull yellow. Total length in the flesh 8.5 inches, wing 4.2, tail 4.1, bill 0.6, tarsus 1.*

ADULT FEMALE—*Slightly duller in plumage than the male, and smaller. Wing 3.6.*

Distribution—Tasmania and some of the larger islands of Bass Strait.

THE Yellow-throated Honey-eater is distributed in favourable situations over a large portion of Tasmania; Dr. L. Holden obtaining nests and eggs both in the extreme north-west and the south-eastern parts of that island. There are also numerous skins in the Australian Museum collection obtained by Mr. George Masters at the Ouse River and Brown's River, in April and May, 1867, and by Mr. K. Broadbent at Badger Head, in February 1879. In Bass Strait, specimens have been obtained by members of the Field Naturalists' Club of Victoria, on King Island, also in the Furneaux Group.

From Tasmania, Dr. L. Holden has kindly sent me the following notes:—"The Yellow-throated Honey-eater is common in the neighbourhood of Hobart, and may occasionally be seen in private gardens, but not in those in the town. The bird's ordinary cry is a rattling repetition of the same note, which feebly recalls the cries of some of the Barbets of India. It also utters a curious churning sound, like 'kra-kra,' while flying from tree to tree and bush to bush, picking insects from under bark, rubbing its bill against stems, and examining clusters of foliage. It builds near the ground and lines its nest with fur or hair. Some nests are thickly felted inside and are remarkable for their warmth and softness; I have one which is chiefly made of wool and lined with rabbit's fur, and was built in a young Native-cherry tree, the only bird's nest I ever saw built in a tree of that species. On 5th February, I found a beautiful nest lined with the fur of the black opossum; it was much the size and shape of half a cocoa-nut and very deep. It was made externally of tea-tree bark and inside that of fine strips of stringybark. The opossum fur was very thickly felted together and formed a close clean bed. The nests are generally three or four feet from the ground. I have never found one in heavy forest, and nearly all seen by me have been quite close to tracks through scrub or lightly timbered country. Once I found one only a few yards above the edge of the water in a great estuary where trees and bushes were very few and most of the neighbourhood consisted of houses and fields. In that nest the lining was a poor one, for rabbits were scarce. A friend of mine saw this species gathering hair from a pony, settling for that purpose on its back and hocks, the pony being very quiet and tied up—cow's hair is also used. The nest is not usually well hidden, however, I once found one in a scraggy little box bush growing in the open which was concealed and surrounded by a tuft of

climbing plant, the dried parts of which exactly resembled the exterior of the nest. A favourite situation is among the young shoots that spring in a clump from the butt of a cut-down Eucalyptus tree. In the breeding season the brightness of the green plumage and the bird's active habits make it very conspicuous. I have found nests with eggs early in September, and once found two half-grown young on the 17th September. I have many notes of seeing the bird building in September, but none in August."

In December, 1906, I noted this species in isolated pairs in various localities around Hobart, my attention first being drawn to it by its notes, some of which resembled so closely those of a tree-frog, that I was doubtful for some time, if they could have been uttered by a bird. At Glenorchy one afternoon, Mr. M. Harrison and Mr. A. Butler, who were in a different part of the bush, returned with an adult male and female that the former had shot, the latter finding their nest about three parts built in a low *Bursaria spinosa*. Subsequently I met with this species at the Cascades, Knocklofty, the Springs, Brown's River, and New Norfolk. At Bellerive, Dr. L. Holden gave me one of its nests, which is thickly coated externally with wool and lined inside with rabbit fur. Close to the beach, he also pointed out a solitary small briar bush in which he had found this species nesting.



NEST OF THE YELLOW-THROATED HONEY-EATER.

A nest taken on the 29th November, 1890, at Circular Head, on the north-west coast of Tasmania, is an open cup-shaped, thick walled structure, outwardly composed of strips of bark, grasses, dead weeds, and sheep's wool, all matted together, and thickly lined inside with a thick layer of cow-hair. Externally it measures five inches in diameter, by three inches and a half in depth, the inner cup measuring two inches and a half in diameter, by two inches in depth. This nest Dr. Holden informs me, was built against the main stem of a low, scraggy box shrub about three feet and a half from the ground, and contained two fresh eggs.

The eggs are two or three in number for a sitting, oval in form, the shell being close-grained, smooth, and slightly lustrous. They are of a fleshy-buff ground colour, becoming darker on the larger end, some having rounded penumbral spots, and others irregular shaped markings of reddish-chestnut or chestnut and underlying spots of dark purple or purplish-grey, the markings predominating as a rule on the thicker end. Some specimens have the ground colour of a

The nest figured which contained two fresh eggs was procured by Mr. E. D. Atkinson, at Waratah, Mount Bischoff, Tasmania, on the 14th October, 1906. Outwardly, it is formed of narrow strips of dried bark intermingled with dried grasses, the inside being entirely lined with opossum fur. It is a compactly built structure and measures externally three inches and three-quarters in diameter by three inches and three-quarters in depth, the inner cup measuring two inches and a half in diameter by two inches and a half in depth. It was attached at the sides to several thin horizontal twigs at the end of a branch of a small-leaved shrub at a height of six feet from the ground.

uniform fleshy-white, others are almost devoid of markings. The set from the nest just described measures:—Length (A) 0·95 × 0·7 inches; (B) 0·91 × 0·7 inches. A set in Mr. G. A. Keartland's collection, taken by Mrs. N. Grave on King Island, in November, 1893, measures:—Length (A) 0·87 × 0·68 inches; (B) 0·88 × 0·68 inches.

Mr. Malcolm Harrison writes me:—"The Yellow-throated Honey-eater is widely distributed in Tasmania, I have seen it in the high Lake country, although not in the numbers which obtain in the low lands, especially about Hobart, where it is very plentiful. The nests are formed of twigs, strips of bark and spiders' cocoons, and lined with fur or hair—nearly always the latter it would appear where cattle are common. They are usually placed about a couple of feet from the ground in a low shrub, the bird apparently having no liking for any particular species, although I have found more nests in young "Box" shrubs (*Bursaria spinosa*) than in any other; occasionally they are attached to the fronds of the ordinary bracken fern. The eggs are two or three in number for a sitting, and in my experience about Hobart, the latter is more common. Nesting operations are commenced early, but the three principal months are September, October, and November.

Mr. R. N. Atkinson writes me from Waratah, Mount Bischoff, Tasmania:—"Ptilotis flavigularis possesses a loud clear note resembling 'chock-chock-chock,' also a succession of low running notes. It usually builds its nest in a low shrub, I have found it at heights varying from a few inches to eight feet from the ground. On more than one occasion I have noted an interval of a fortnight from the apparent completion of the nest until the first egg was laid. My uncle the Rev. H. D. Atkinson of Evandale, found a nest on 13th October, 1887, containing three eggs. The nest was a deep cup-shaped structure, lined with wool and built in a low scrubby bush."

Ptilotis flava.

YELLOW HONEY-EATER.

Ptilotis flava, Gould, Proc. Zool. Soc., 1842, p. 136; *id.*, Bds. Austr., fol., Vol. IV., pl. 42 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 518 (1865); Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 246 (1884).

ADULT MALE—All the upper surface including the head, wings and tail olive yellow; inner webs of quills brown; the entire under surface, under wing and under tail-coverts delicate citron-yellow; in front of the eye a small dusky spot; ear-coverts and cheeks olive-yellow; a short indistinct streak above and behind the eye and another below the lores extending obliquely across the cheeks yellow. Total length 6·7 inches, wing 3·5, tail 3·2, bill 0·6, tarsus 0·9.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-eastern Queensland.

THE Yellow Honey-eater is freely dispersed in some of the coastal districts of North-eastern Queensland. There are specimens in the Australian Museum collection obtained by Mr. E. Spalding near Cardwell, and by Mr. J. Rainbird at Port Denison. Dr. Ramsay remarks:—"Ptilotis flava, a very beautiful species and perhaps the most common bird about Cardwell, is frequently seen clinging to the flowers of the bananas and plantains in cultivations. When among the blossoms of the *Acacia* they are scarcely discernable, so closely does their yellow plumage match the tint of the blossoms."^{*}

Dr. Ramsay† has also included Cape York District, and the Gulf of Carpentaria, in the range of this species. It is remarkable, however, that *Ptilotis flava* does not appear in any

* Proc. Zool Soc., 1875, p. 596

† Tab. List Austr. Bds. p. 13 (1888).

of the recorded lists of specimens of the numerous collections made in these parts. Neither have I seen it in any collection made in the neighbourhood of Cairns, which is comparatively only a short distance north of Cardwell, where it is common. Mr. B. Jardine, who has lived at Cape York all his life, informs me that he has never met with *P. flava* on the Cape York Peninsula, and Mr. Frank Hislop tells me that he has never seen it in the Bloomfield River District. Gould's habitat given in his original description "North Coast of Australia," is undoubtedly an error, as is also a similar one given to *Ptilotis versicolor* described on the same page.

When resident at the Herbert River, North-eastern Queensland, Mr. J. A. Boyd forwarded me a nest and several sets of eggs taken on Ripple Creek Plantation.

The nest is a cup-shaped structure, and is chiefly composed of the brown hair-like fibre of the cocoa-nut palm, with which is intermingled spiders' webs and a few narrow strips of bark. It measures externally three inches in diameter by two inches and three-quarters in depth, the inner cup measuring two inches and a half in diameter by two inches in depth. This nest was suspended by the rim to the thin leafy twigs of a Cumquat Orange Tree, one of the leaves being worked into the side of the structure, and was within hand's reach of the ground. Mr. Boyd remarks:—"All the nests taken by me were mostly composed of cocoa-nut fibre. I cannot say what material *Ptilotis flava* used for building its nest before cocoa-nut trees were planted here, but it could easily obtain supplies from decaying Palms and wild Bananas. Two nests were built in a species of *Ficus*, eighteen feet from the ground, another as high as thirty feet, and one in a Mango tree about eight feet from the ground."

The eggs are two in number for a sitting, oval in form, the shell being close-grained, smooth and lustreless. In ground colour they vary from a almost pure white to a faint reddish-white, which is thickly blotched towards the larger end with different shades of reddish-chestnut, or pale purplish-red, with which are intermingled on some specimens similar underlying markings of light purplish-grey. Others have large penumbral blotches, or those of one colour partially overlying another, but in all as a rule they predominate chiefly on the larger end where they are confluent and frequently form a more or less well defined zone. A set of two taken by Mr. J. A. Boyd, on the 16th January, 1890, measures:—Length (A) 0·87 × 0·62 inches; (B) 0·9 × 0·65 inches. A set of two taken on the 7th December, 1892, measure:—Length (A) 0·87 × 0·63 inches; (B) 0·84 × 0·63 inches.

In addition to the dates quoted above, Mr. Boyd informed me that a boy brought him a nest and two eggs of *P. flava* on the 10th November, 1892, that he had taken that day. Mr. Boyd found a nest with two nearly fledged young on the 2nd October, 1893, and another on the same day with two eggs. On the 31st October, 1894, he saw this species building, and on the 9th November found a nest with two fresh eggs.

Ptilotis flavescens.

YELLOW-TINTED HONEY-EATER.

Ptilotis flavescens, Gould, Proc. Zool. Soc., 1839, p. 144: *id.*, Bds. Austr., fol. Vol. IV., pl. 41 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 517 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 245 (1884).

ADULT MALE—*General colour above very pale brown washed with yellow, which is more pronounced on the rump and upper tail-coverts, these parts in some specimens being distinctly tinged with isabelline; quills brown, whitish around the tips of the secondaries and all but the outermost two on either side externally margined with bright olive-yellow; tail feathers brown, whitish around their tips, the central pair margined on both webs, and the remainder on their outer webs only with bright olive-yellow;*

head like the back, but with a more pronounced yellow wash, particularly on the forehead; lores, sides of the head and ear-coverts yellow, the lower portion of the latter blackish forming a pronounced streak, below and behind which is a small tuft of brighter yellow plumes; chin, throat, and fore neck bright yellow, remainder of the under surface and under tail-coverts pale yellow. Total length 5.5 inches, wing 3, tail 2.4, bill 0.5, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male but slightly smaller.

Distribution—North-western Australia, Northern Territory of South Australia, Northern Queensland.

THE Yellow-tinted Honey-eater is widely distributed over the northern portions of the Australian continent. The type was described by Gould in 1839 from a single specimen obtained by Mr. Benjamin Bynoe on the North-western coast of Australia, during the stay there of Her Majesty's Surveying-ship "Beagle." There are specimens in the Australian Museum collection procured by Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower, near Derby, also by Mr. G. A. Kearnland, near the junction of the Fitzroy and Margaret Rivers in North-western Australia, and by the late Captain Armit, near Georgetown, Queensland. Dr. E. Hartert has also recently recorded it from George Creek in the Northern Territory of South Australia.*



NEST OF THE YELLOW-TINTED HONEY-EATER.

Two nests received from Mr. G. A. Kearnland are deep cup-shaped structures, outwardly formed of bark fibre, plant down, and spiders' webs finely woven together, the inside being thickly lined with fine dried grasses. They are both of about the same average measurements and are built at the junction of thin forked leafy branches of *Bauhinia* trees, at a height of six feet from the ground. The nest here figured is two inches and a half in diameter by three inches in depth.

The eggs are oval in form, the shell being close-grained, smooth and lustreless. They are of a light reddish-buff ground colour, one specimen being much paler than the other and almost of a fleshy-buff hue, which is spotted and dotted with chestnut and purplish-red; with the exception of a few isolated dots, the markings being confined to a fairly well defined zone around the larger end of each specimen. Length (A) 0.7 × 0.55 inches; (B) 0.7 × 0.57 inches.

There is a slight variation in the colour of specimens, some having the upper parts paler, others have the sides of the head and the throat of a much brighter yellow, particularly the latter. The above description is taken from a richly plumaged male obtained by the late Mr. T. H. Bowyer-Bower, at Derby, North-western Australia in 1886.

* Nov. Zool., Vol. XII., p. 234 (1905).

Mr. G. A. Keartland sent me for examination skins, nests, and eggs of this species, together with the following notes:—"During the stay of the Calvert Exploring Expedition in North-western Australia, *Ptilotis flavescens* was found in great numbers along the course of the Fitzroy and Margaret Rivers, and was never met with far from water. They were often seen drinking, bathing, and preening their feathers. Their note is a squeaking chirp, very similar to one uttered by *Ptilotis pencillata*, but unlike that species they are very sociable, assembling in flocks on the sides of pools or water troughs, from twenty to forty or more in number. When disturbed they scatter in all directions, each taking its own course. The sexes are alike in plumage and can only be distinguished by dissection. They were just building their nests when we left the district in March 1897. The skins forwarded—an adult male and female—I obtained on the 6th January, and the nests and eggs were taken in the same locality during March 1899."

Young birds have the upper parts paler than in the adults and tinged with an isabelline hue. The sides of the head and throat are of a paler yellow, the patch of yellow plumes below the ear-coverts are paler and smaller, and the streak at the bottom of the latter brown. Wing 2·7 inches.

In the "Catalogue of Birds in the British Museum,"* Dr. H. Gadow places *Ptilotis germana* as a subspecies of *P. flavescens*, and writes:—"Very similar to *P. flavescens*, from which it differs in its considerably smaller size and in having the yellow stripe behind the eye and the black stripe beneath the ear-coverts more developed. I refer the two specimens from Port Moresby, New Guinea, collected by Mr. Stone, to this form, which does not deserve specific rank. Very likely *P. germana*, the habitat of which species is the north coast of Australia, and not West Australia, as has sometimes been stated, in order to establish a different geographical range for the two species or races respectively in question. Mr. Gould frequently understood by North-west Australia, the country west of the Cape York Peninsula."

I have the type of *Ptilotis germana*† now before me, and agree with Dr. Gadow that it is closely allied to *P. flavescens*, and in addition to the characters pointed out by him, it has the upper parts darker and the under parts more distinctly streaked than in *P. flavescens*. It is a *lapsus calami* on the part of Dr. Gadow to state that it differs from the latter "in its considerably smaller size" for he gives the wing-measurement of *P. germana* as 3 inches, and that of *P. flavescens* as 2·65 - 2·75 inches. The latter are undoubtedly females, the specimens he refers to *P. germana* being males. The wing-measurement of adult males of *P. flavescens* in the Australian Museum collection varies from 2·6 to 2·8 inches. That of the type of *P. germana* is 3·07 inches. An apparently young male in the collection from Port Moresby, New Guinea, is indistinguishable from young birds of *P. flavescens* obtained at Derby, North-western Australia. The precise locality where the type of *P. germana* was procured is not stated, its habitat in the original description being given as "Torres Straits." Further on in the same volume, Dr. Ramsay referring to *P. germana* from Port Moresby, remarks:—"I have only seen three specimens of this species, but I believe it is also found in the islands in Torres Straits."‡

Dr. Gadow's statement that "Mr. Gould frequently understood by North-west Australia the country west of the Cape York Peninsula," is undoubtedly an error. Gould in his original description of *P. flavescens* gives its habitat as North-west coast of Australia, and in his "Table of Distribution" of Australian Birds in his Handbook,§ recognises each of the Australian colonies as then defined.

* Gadow, Cat. Bds. Brit. Mus., Vol. VIII. p. 246 (1884)

† Ramsay, Proc. Linn. Soc. N S. Wales, Vol. III., pp. 2, 39, 285 (1879). ‡ *Loc. cit.*, p. 285 (1879).

§ Gould, Handbk. Bds. Austr., Vol. II., p. 585 (1865).

Ptilotis penicillata.

WHITE-PLUMED HONEY-EATER.

Meliphaga penicillata, Gould, Proc. Zool. Soc., 1836, p. 143.

Ptilotis penicillatus, Gould, Bds. Austr., fol., Vol. IV., pl. 43 (1848).

Ptilotis penicillata, Gould, Handbk. Bds. Austr., Vol. I., p. 519 (1865); Galow, Cat. Bds. Brit. Mus., Vol. IX., p. 244 (1884).

ADULT MALE.—*General colour above pale greyish-brown slightly tinged with olive; the rump and upper tail-coverts more strongly washed with dull olive-yellow; upper wing-coverts like the back, the greater series washed with olive-yellow; quills brown their outer webs externally margined with olive-yellow, except the apical portion and tips of the primaries which in some specimens have narrow whitish edges; tail feathers brown the central pair and outer webs of the remainder washed with olive-yellow; crown of head and hind neck like the back but strongly washed with dull yellow; lores, sides of the head and ear-coverts dull yellow; behind the ear-coverts a tuft of silky white plumes; all the under surface pale brownish-white, lighter on the centre of the lower breast and the abdomen, and washed with yellow on the chin, throat, fore neck and upper breast, which is more conspicuous on the lower throat and face neck; under tail-coverts faint yellowish-white with pale brown shaft streaks; bill black; legs and feet reddish-brown; iris dark brown. Total length in the flesh 6.75 inches, wing 3.4, tail 3, bill 0.5, tarsus 0.86.*

ADULT FEMALE.—*Similar in plumage to the male, but smaller.*

Distribution.—Queensland, New South Wales, Victoria, South Australia.

THE type of this familiar and well-known species, described by Gould, was obtained in New South Wales, over the central and western portions of which it is freely distributed. It is exceedingly common in Victoria and South Australia, especially in the southern parts, and is the best known species of the genus around Melbourne and Adelaide. Although so numerous in the coastal districts of the two latter States, it does not occur near the coast in New South Wales; probably this is the reason Gould remarked this species was rarely met with there. In the latter State I found it abundant about Wellington and Dubbo, and especially in the *Eucalypti* on the banks of the Bell and Macquarie Rivers, and later on in North-western New South Wales in the trees bordering the banks of the Namoi, Mehi, and Gwydir Rivers, to which localities it appeared to be almost entirely confined, for it evinces a decided preference for the vicinity of water. Open forest lands are also favourite haunts of this species; in Victoria and South Australia it breeds in private and public gardens in the cities.

When engaged in searching for food among the leafy sprays or blossoms of the *Eucalypti*, a single note only is usually uttered, but when alarmed, or if one is in the vicinity of its nest, a succession of evident keen notes of displeasure are rapidly poured forth, as it boldly approaches within a few feet of the intruder.

Among a large series of specimens in the Australian Museum collection are examples from the Dawson River, Queensland, the Gwydir, Darling, Lachlan, Bell, and Macquarie Rivers, New South Wales, and the vicinity of Melbourne, Victoria, and Adelaide, South Australia. Variation is found in the tint of plumage of examples from different localities. Specimens from the vicinity of Adelaide and Melbourne are darker than those procured from the margins of the Darling and Lachlan Rivers, New South Wales, but there is not so marked a difference between specimens from the latter localities than those obtained on the Gwydir River, Northern New South Wales and the Dawson River, Queensland.

Mr. E. H. Lane writes me:—"Out of dozens of nests of *Ptilotis penicillata* examined in the Dubbo District, New South Wales, I have always found three eggs to be the sitting."

Mr. A. E. Ivatt informs me that at Glanmire near Bathurst, on the 10th and 11th October, 1895, he observed flocks of these birds arriving from the west.

Dr. W. Macgillivray writes me:—" *Ptilotis penicillata* was common in the suburbs of Melbourne. One of these birds used to visit my garden to feed upon the tubular flowers of a *Tecoma*, and finding the flowers too deep for the length of the bill the corolla was in each instance pierced near its base and so rifled of its honeyed store."

The nest is a neat cup-shaped structure, outwardly formed of grasses, spiders' webs, and the downy portions of dead flowers, the inside being lined with the latter material, horse-hair, and occasionally with a feather or two worked into the bottom or side of the structure. An average one measures externally two inches and a third in diameter by two inches in depth; the inner cup measuring two inches in diameter by one inch and three-quarters in depth. The nests vary in the thickness of the walls and of the materials of which they are formed. Nests received from Mr. E. H. Lane, of Wambangalang Station, and accompanied with skins of the birds, were formed throughout of long pieces of wiry pale green grass stems, with a slight admixture of cobwebs, and were lined at the bottom only with sheep's wool. The nest is attached at the rim to thin leafy drooping twigs of a tree, usually a species of *Eucalyptus*, *Acacia*, or *Casuarina*, and frequently in one overhanging water. In public parks and gardens any suitable tree is utilized. The site selected varies in height from a few feet to sixty feet from the ground. The nests and eggs of this species—well known to bird-nesting boys around Melbourne, as the "Greenie"—were exceedingly common in my early collecting days, and they were the first of any Honey-eater's nests and eggs I found.

The eggs are usually three, and occasionally only two in number for a sitting, oval in form, the shell being close-grained, smooth, and almost lustreless. In ground colour they vary from almost pure white to rich yellowish-buff, and a light red; of many sets now before me taken by Mr. John Ramsay at Cardington, on the Bell River, New South Wales, buffy-white is the prevailing ground colour. Some specimens are freckled and spotted uniformly over the shell with reddish-chestnut, in others the markings are of a deep reddish-purple with faint underlying spots of purplish-grey, predominating in some on the thicker end where an ill-defined cap or zone is formed of confluent markings. Some specimens have the markings and spots rounded in form, others of irregular shape. A set of three in the Australian Museum collection, taken at Cardington, measures:—Length (A) 0·82 × 0·6 inches; (B) 0·83 × 0·59 inches; (C) 0·82 × 0·59 inches. A set of three taken by Mr. E. H. Lane, on Wambangalang Station, near Dubbo, New South Wales, measures:—Length (A) 0·8 × 0·62 inches; (B) 0·8 × 0·61 inches; (C) 0·8 × 0·61 inches. A set of two taken by Mr. Lane on the 9th November, 1892, measures:—Length (A) 0·77 × 0·57 inches; (B) 0·78 × 0·57 inches. This set also contains an egg of the Pallid Cuckoo found in the same nest.

August to the end of December constitutes the usual breeding season in New South Wales and Victoria, but in the latter State I have found eggs in the middle of July and a nest with young, at the end of February.

Ptilotis leilavalensis.

PALLID HONEY-EATER.

Ptilotis leilavalensis, North, Rec. Austr. Museum, Vol. III., pt. 5, p. 106, (17th April, 1899);
Hartert, Nov. Zool., Vol. XII., p. 234 (1905).

Ptilotis penicillata, (*nee* Gould) Keartl., Rep. Horn Exped. Centr. Austr., Part II, Zool., p. 109
(1896).

ADULT MALE—*General colour above pale ashy-brown, tinged with yellow, the rump and upper tail-coverts more distinctly washed with yellow; upper wing-coverts like the back, the greater series margined with bright olive-yellow; quills brown strongly washed on their outer webs with bright olive-yellow, their apical portion and tips with narrow whitish edges; tail feathers brown with whitish tips, the two central feathers and the outer webs of the remainder washed with bright olive-yellow; lores, forehead, sides of the head, cheeks, and ear-coverts bright yellow, crown of the head and nape pale ashy-brown washed with yellow; behind the ear-coverts a patch of silky-white plumes; all the under surface faint buffy-white slightly tinged with yellow, which is more pronounced on the chin, throat, and fore neck; under tail-coverts very pale yellow; bill black; legs and feet of skin, fleshy-brown. Total length 6.6 inches, wing 3.25, tail 2.4, bill 0.5, tarsus 0.8.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Gulf District of Queensland, Central Australia, South Australia, North-western Australia.

THE Pallid Honey-eater resembles both *Ptilotis penicillata* and *P. flavescens*. From the former, to which it is closely allied and an undoubted form, it may be chiefly distinguished by its paler upper and under parts and more brightly coloured head. From the latter in the far less pronouncedly yellow chin and throat and under surface, and the absence of the distinct blackish line of plumes beneath the ear-coverts. It was described by me in 1889 from a single specimen presented to the Trustees of the Australian Museum by Dr. W. Macgillivray, and obtained by his brother Mr. A. S. Macgillivray, on Leilavale Station, North Queensland. In the original description I also pointed out it was distinguished from *P. penicillata* by the absence of the blackish line which separates the silky-white patch of feathers from the ear-coverts. This I find on the examination of a large series of adult specimens of the latter, is not quite correct, a brownish or slightly dusky wash to the tips of the lower ear-coverts is certainly found in some examples of *P. penicillata*, in others it is absent. The apparent distinctness of these lines depends too on the make up of the skin and whether it is viewed when held to or away from the light. Neither Gould or Dr. Gadov make any reference to it in their descriptions of *P. penicillata*.

On the 6th January, 1901, Dr. W. Macgillivray presented two more adult specimens to the Trustees, and wrote me as follows:—"In your original description of *Ptilotis leilavalensis*, you state, from *P. penicillata* it may be distinguished 'by the absence of the blackish line which separates the silky-white patch of feathers from the ear-coverts.' Does your examination of the additional specimens bear this out?" In the more recently presented specimens there are strong indications of darker tips to the lower ear-coverts, especially in one when viewed in certain lights. When closely examined, however, it will be found to be chiefly due to the decurved tips of the ear-coverts, and is more apparent than real. Thus when placed lengthways on a table with the sun shining partially upon it, and the specimen facing the sun, but being in the shade, the dark mark between the ear-coverts and silky-white patch of feathers appears most pronounced, but when the specimen is laid across the table and reversed from the tail to the head it is almost entirely absent. In other respects both specimens which were acquiring some new quills and tail-feathers when they were procured, are larger than the type,

the wing measurement of the latter which is probably a female, is only 2·8 inches. The adult male whose measurements are given in the preceding description, differs from the type in the more pronounced bright olive wash on the greater wing-coverts, the clearer yellow sides of the head, in strong contrast to the crown and nape which is less distinctly washed with yellow, as is also the centre of the throat and fore neck.

Dr. W. Macgillivray informs me that these birds are fairly common in the tea-trees along the banks of the Fullerton River, on Leilavale Station, thirty miles east of Cloncurry, Queensland. A set of three eggs taken by Mr. A. S. Macgillivray from a small nest in the spring of 1901 on Leilavale Station, are inclined to thick oval in form and vary in ground colour from buffy-white to yellowish-buff, over which is distributed spots and freckles of purplish-red, which are larger on two specimens and darker on one on the thicker end where they are chiefly confined, fainter subsurface markings appearing as if beneath the surface of the shell. Length (A) 0·78 × 0·6 inches; (B) 0·79 × 0·6 inches; (C) 0·76 × 0·61 inches. As might be expected, they are indistinguishable from a variety of the eggs of *Ptilotis penicillata*. Dr. Macgillivray also informs me that his brother sent him a single egg of *P. leilavalensis*, also an egg of the Pallid Cuckoo found in the same nest.

The range of this species in a southerly direction appears to extend through the central portions of the continent to the Flinders Range and Port Augusta in South Australia, of which there are specimens in the Australian Museum collection; also two in the South Australian Museum, Adelaide, one a young bird from Warrina, the other an adult picked up in a dry creek after a storm, by Mr. A. Zietz, the Assistant Director, at Lake Callabona in 1924. Comparing these specimens with those from the Cloncurry District, Queensland, there is a slight variation in the colours, principally on the under parts, some of them approaching a very faint creamy-buff slightly tinged with yellow.

Dr. A. M. Morgan, who accompanied Dr. A. Chenery in July and August 1900 in a trip from Port Augusta to Mount Gunson and back, thus refers to this brightly coloured form:— "*Ptilotis penicillata* was common at Port Augusta, but further north was seen only in the gum creeks. All birds examined were of the *light coloured variety*. Three nests were found; two at Elizabeth Creek on the 7th August, 1900, one building, the other with three nearly fresh eggs, and another at Yultacowie Creek four days later with two eggs. All were built in the overhanging branches of gum trees."

From North-western Australia Dr. E. Hartert,⁷ has recorded it from Marble Bar and Nullagine Road, and there is no doubt that the birds met with by the Calvert Exploring Expedition between Lake Way and Lake Augusta in Western Australia, which is referred by Mr. G. A. Keartland to *Ptilotis penicillata*, also those he observed at Davenport Creek, when with the Horn Scientific Expedition in Central Australia, belonged to this form.

A nest referable to *P. leilavalensis* taken by Mr. C. E. Cowle at Illamurta, in Central Australia, in August 1899, is an unusually neat cup-shaped structure, formed throughout of fine pale yellowish-brown wiry rootlets held together with plant-down and spider's webs, the inside being sparingly lined with similar but finer rootlets. Externally it measures three inches in diameter by two inches in depth; the inner cup measuring two inches and a quarter in diameter by one inch and three-quarters in depth. It contained two eggs, elongated ovals in form, the shell being close-grained, smooth and lustreless. They are of a dull white ground colour, and have both rounded and irregular shaped spots of purplish-brown intermingled with similar underlying markings of faint purplish-grey, which predominate on the thicker end. Length (A) 0·8 × 0·56 inches; (B) 0·82 × 0·57 inches.

⁷ Nov. Zool., Vol. XII., p. 234, (1905).

A specimen received in the flesh shot by Dr. A. Chenery on the 11th June, 1905, on the Flinders Range, twelve miles from Port Augusta, shows a further advance towards the intergradation of *P. leilivalensis* with *P. penicillata*.

Ptilotis ornata.

GRACEFUL HONEY-EATER.

Ptilotis ornatus, Gould, Proc. Zool. Soc., 1838, p. 24; *id.*, Bds. Aust., fol., Vol. IV., pl. 39 (1848).

Ptilotis ornata, Gould, Handbk., Bds. Austr., Vol. I., p. 515 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 244 (1884).

ADULT MALE—*General colour above olive-brown slightly tinged with grey; the upper tail-coverts washed with olive-yellow; upper wing-coverts olive-brown, the median and greater series washed with olive-yellow; quills brown, externally margined with bright olive-yellow; tail feathers brown, the central pair, and the outer webs of the remainder strongly washed with olive-yellow; forehead and crown of the head dull olive-yellow; lores and a narrow line of feathers around the eye dusky-brown, below which is a short deep yellow streak; ear coverts olive-yellow with a dusky wash at their tips forming a distinct line which is followed by a patch of bright yellow lengthened plumes, the long narrow point terminating towards the back; all the under surface dingy-white, the feathers having a longitudinal streak of brown down the centre, except those on the centre of the lower breast and the abdomen where they are of a purer white; under tail-coverts white with narrow central streaks of brown; under wing-coverts light fulvous, some of the feathers on the edge of the wing yellow; bill black; legs and feet grey; iris dark brown. Total length 6 inches, wing 3.4, tail 2.9, bill 0.5, tarsus 0.82.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—New South Wales, Victoria, South Australia, Western Australia.

THE Graceful Honey-eater inhabits the southern portion of the Australian continent. It is common in many parts of South Australia, North-western Victoria, South-western New South Wales, and Western Australia. It is represented in the Australian Museum collection by specimens obtained by Mr. George Masters, at Mongup, Salt River, Western Australia, in 1865, others procured by Mr. K. Broadbent, in the neighbourhood of Port Augusta, South Australia, and by an example obtained by the late Mr. K. H. Bennett in Southern New South Wales. This specimen is labelled by Mr. Bennett "*Ptilotis ornata*, Yandembah Station, 9th September, 1889, killed and dropped by *Falco lunulatus*," and who further remarks in his MS. notes—" *Ptilotis ornata* is very numerous in the dense mallee scrub some sixty miles to the northwards, and appears to be entirely independent of water. It breeds during the months of October and November." I have also received from the South Australian Museum specimens for examination obtained by Mr. Edwin Ashby, also by Dr. A. M. Morgan at Donald's Plain, who accompanied Dr. A. Chenery on a trip made from Port Augusta to the Gawler Ranges, in August 1902. Dr. Morgan has kindly forwarded a photograph of a nest together with the following note:—" *Ptilotis ornata* was only seen in large mallee at Donald's Plain. It was very common and two females were obtained. A nest was found on the 14th August at Matera Well in overhanging leaves of mallee, at a height of seven feet from the ground. It was built of grass stems and lined with a little rabbit fur, and contained one fresh egg."

Some specimens have the apical portion of the outer webs of the outermost primaries and tips of the remainder of the quills with narrow whitish edges. The wing-measurement of adult specimens varies from 3.2 to 3.45 inches.

Mr. C. French, Junr., presented three nests of this species to the Trustees of the Australian Museum, and through him I have received the following notes from Mr. Charles McLennan, who took the nests on Pine Plains Station in the Wimmera District, Victoria, in 1902:—" *Ptilotis ornata* is common in the mallee scrubs of North-western Victoria, and is often seen in company with *P. penicillata*, which it resembles in habits; like that species too, it often utters a succession of long shrill warning notes. It feeds upon honey extracted from flowers, also insects, and I have seen it eating the scale on mallee bushes. It builds a cup-shaped nest, which is usually attached to the drooping leafy twigs of the mallee gum, at a height varying from about four to twelve feet from the ground. Two or three eggs are laid for a sitting. The breeding season commences at the latter end of July and continues until the middle of January. The first nest I found this season was on the 7th August, 1902, which contained two fresh eggs, and the last on the 20th December, in which were three hard set eggs."

With a nest sent from Broome Hill, Western Australia, Mr. Tom Carter writes:—" *Ptilotis ornata* is a very common species from the Geraldton District to Broome Hill, but I did not meet with it as far south as Albany. It utters a great variety of notes, and is very pugnacious in the pairing season, small flocks of five or six, frequently fighting almost at one's feet, on the ground. In the Broome Hill District nests have been noted from August until the end of November."

The nest is an open cup-shaped structure, slightly contracted at the rim, and formed externally of fine green grasses, silky plant-down and egg-bags of spiders matted together, the inside of some being lined almost entirely with grasses, others with an admixture of grasses, plant-down, feathers or wool. An average nest measures externally two inches and three-quarters in diameter by two inches in depth; the inner cup measuring at the rim two inches, and in depth one inch and a half. Of the nests referred to above, taken by Mr. McLennan, one is lined entirely with very fine green grasses with the exception of a little plant-down at the bottom; a somewhat similar structure is thickly and smoothly coated externally with fine white plant-down; another is lined with fine green grasses, plant-down, wool, a number of brilliant blue and black feathers from the adult male of *Malurus melanotus*, and a few pink plumes of *Chlamydotera maculata*. All are built in a species of *Eucalyptus*, two being attached at the sides to several drooping leafy twigs, the other having the rim firmly worked over a thin horizontal fork.

The eggs are usually two, sometimes three in number for a sitting, oval in form, the shell being close-grained, smooth and slightly lustrous. Typically they are of a pale salmon-red ground colour, over which is distributed minute freckles, spots, and small irregular shaped markings varying from reddish-brown to rich red and faint purplish-red, which predominate as a rule at the larger end, forming in some instances a more or less well defined cap or zone. Two eggs of the sets obtained by Mr. McLennan have a faint yellowish-buff ground colour passing into reddish-buff on the larger end, where there is a few almost invisible spots and indistinct blotches of a slightly darker shade. A remarkably handsome set of two are of a rich salmon-red, the ground colour gradually becoming darker and forming a clouded cap on the larger end. The eggs of another set are of a uniform rich salmon-red ground colour which is irregularly spotted and blotched with faint purplish-red and reddish-brown, some of the markings appearing as if beneath the surface of the shell. A set of two measures:—Length (A) 0.78 × 0.56 inches; (B) 0.8 × 0.59 inches. Another set measures:—Length (A) 0.73 × 0.56 inches; (B) 0.75 × 0.55 inches.

As will be seen from the preceding notes, the breeding season of the Graceful Honey-eater in South-eastern Australia, extends from the latter end of July into January.

Ptilotis plumula.

PLUMED HONEY-EATER.

Ptilotis plumulus, Gould, Proc. Zool. Soc., 1840, p. 150; *id.*, Bds. Austr., fol., Vol. IV., pl. 40 (1848).

Ptilotis plumula, Gould, Handbk. Bds. Austr. Vol. I., p. 516 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 245 (1884); North, Proc. Linn. Soc. N.S.W., Vol. XXX., p. 260 (1905).

ADULT MALE—*General colour above pale olive-yellow, distinctly tinged with grey on the mantle, scapulars, and back, and passing into a clearer olive-yellow on the rump and upper tail-coverts; upper wing-coverts like the back; quills dark brown externally margined with olive-yellow; tail feathers dark brown, the central pair strongly washed and the outer webs of the remainder margined with olive-yellow; a band on the forehead light grey, passing into bright olive-yellow on the crown and sides of the head; lores and feathers in front of the eye blackish; ear-coverts dull olive-yellow, blackish-brown at the tips forming a narrow but distinct line, which is followed by a fan-shaped patch of bright yellow plumes spreading over the sides of the neck; cheeks, chin, throat, fore neck and upper breast yellowish-grey, the lower throat being of a richer shade of yellow, also the margins of the feathers on the fore neck and upper breast, giving the centres a faintly streaked appearance; lower breast and abdomen yellowish-white with an almost imperceptible tinge of buff; under tail-coverts pale yellow; "bill black; legs and feet light slate colour tinged with brown; iris dark brown"* (Chenery). *Total length in the flesh 6.8 inches, wing 3.1, tail 2.8, bill 0.5, tarsus 0.78.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, South Australia, Western Australia.

THE Plumed Honey-eater is often found frequenting the same situations as the preceding species, and the numerous specimens I have examined were all obtained in the southern portion of the continent. I have never seen any record of a specimen being procured in the Northern Territory of South Australia; not a single example was included in the large collections made by Mr. A. Morton at Port Darwin and Port Essington, or by the late Mr. Edward Spalding and Dr. Loria at Port Darwin, nor by Mr. F. Schultze, who collected over four hundred bird skins in different parts of the Northern Territory, on behalf of the South Australian Museum, Adelaide. Dr. Ramsay informs me that the inclusion of this species in the Port Darwin and Port Essington Districts in his "Tabular List of Australian Birds,"* is probably an error, for he has no recollection of seeing or hearing of an example being obtained in the Northern Territory. Mr. C. W. DeVis† has recorded it in a collection of birds made by Mr. Kendal Broadbent at the mouth of the Norman River, Gulf District, Queensland. Mr. Broadbent records it from Chinchilla, in Southern Queensland,‡ and a bird collected by him above Yaamba on the Fitzroy River is also referred to this species.

I have received five unlocalized specimens for examination from the Trustees of the South Australian Museum, Adelaide, and Mr. A. Zietz, the Assistant Director, informs me that specimens were received at that Institution in 1873 from the Gawler Ranges, also from Overland Corner in 1883, collected by the late Mr. F. W. Andrews. The latter locality is situated on the Murray River, and is about forty miles from the Victorian border. Most of the specimens in the Australian Museum collection were collected by Mr. K. Broadbent near Port Augusta, South Australia. From the same State also is an adult male and female obtained by Mr. G. Masters in the Flinders Range in November, 1865. There is also an adult male in the Australian Museum collection obtained by the late Mr. K. H. Bennett, at Moolah Station, Western New South Wales, in July, 1882, with which he sent the following note:—"This bird is only met with

* Tab. List Austr. Bds., p. 13 (1888).

† Proc. Roy. Soc. Queensland, Vol. I, p. 156 (1884). ‡ *Loc. cit.*, Vol. II., p. 123 (1885).

in the mallee country and is never found on the plains. It is much more plentiful than *Ptilotis leucotis*. Only on one occasion have I found its nest which was in the month of December. It was of similar construction and materials, but differently placed from that of *P. penicillata*, being suspended from two parallel horizontal twigs about two inches apart, and contained two eggs of a pinkish-white ground colour, zoned at the thicker end with spots of a darker hue."

The wing-measurement of adult males varies from 2·8 to 3·15 inches. The feathers on the basal portion of the forehead of some adult specimens from Western Australia, South Australia, and New South Wales, are light grey.

Mr. Edwin Ashby kindly sent me specimens for examination together with the following notes:—"On the 16th May, 1900, at Nackara, twenty miles east of Petersburg, South Australia, I found *Ptilotis plumula* in great numbers. The gums in flower were literally swarming with them, and had I ammunition enough I could have shot hundreds. Some of the birds were young and had evidently only left the nest a few weeks. The specimen from Callion, Western Australia, I procured in August 1901. This was the only bird I saw of this species, and it was obtained on the same day and the same place as its near relative *Ptilotis ornata*."



NEST OF THE PLUMED HONEY-EATER.

A nest received from Dr. A. Chenery is a deep cup-shaped structure, being slightly contracted at the rim which is firmly worked over two thin horizontal leafy-twigs of a salt-bush, another thin twig running at right angles being securely fastened to the other side of the structure. It is formed throughout of bark fibre, fine dried grasses, plant down, cobwebs and egg-bags of spiders, neatly woven together with a slight lining of fine dried grasses and at the bottom with a small quantity of fur. Externally it measures three inches in diameter, and at the rim where it is contracted, two inches and a half; depth two inches and a quarter, the inner cup averaging

two inches in diameter by two inches in depth.

With an adult male obtained by Dr. A. Chenery, on the 20th July, 1902, I received the following note:—" *Ptilotis plumula* occurs in the Flinders Range, near Port Augusta, South Australia. It is also found in the gums on the creeks running down from the gullies, but does not come out on to the plains for any distance. Up the Gawler Range track Dr. Morgan and myself saw them in the mallee at the foot of the hills." Writing later relative to a nest and set of two eggs presented to the Trustees of the Australian Museum, Dr. Chenery remarks:—"My experience of the only three nests of *Ptilotis plumula* I have found in the Flinders Range is that this species never comes out of the mountain creeks and seems to prefer to breed on the sides of the hills in rather isolated patches, or in the scrub far up from the foothills. The nest I send was found in September 1904, and was built in a salt-bush two feet and a half from the ground, and contained three eggs in so advanced a stage of incubation, that I could not blow them. Another found on the side of a hill in Flinders Range, in a small shrub in June 1903,

had one egg in it. The birds are plentiful enough, but the nests are not easy to find, so far I have discovered them by following birds with nesting material in their bills, and watching their destination up the side of the range. They seem careless as to the time they build, for I have observed fledged young in May." Three adult specimens obtained by Dr. Chenery on the 1st May, 1905, and received in the flesh by the Trustees of the Australian Museum five days later, had the bills black and the legs and feet dark fleshy-grey.

Dr. A. M. Morgan referring to the above trip to the Gawler Ranges in August 1902, sends me the following note:—"Ptilotis plumula was very numerous in the gums in a creek at Concupidney, and seen occasionally in *Eucalypti* till past Nonning. At the former place a nest was found on the 4th August, 1902, in an overhanging branch of a gum. It was built of dry grass stems and wool intermixed, studded outside with old white spiders' cocoons, and lined inside with wool and horse-hair; it contained two fresh eggs."

The eggs are usually two, sometimes three in number for a sitting, oval in form, the shell being close-grained, smooth and almost lustreless. They vary from a fleshy-buff to a pale salmon colour which passes into a darker hue on the larger end, and are very sparingly sprinkled all over the shell with minute irregular shaped markings of different shades of chestnut-red. A set of two taken by Dr. Chenery and Dr. Morgan, on the 4th August, 1902, at Concupidney, South Australia, measure as follows:—Length (A) 0.76 × 0.58 inches; (B) 0.78 × 0.59 inches. The eggs of this species are not unlike very pale varieties of the eggs of *Ptilotis fusca*.

Young birds resemble the adults, but most of the feathers on the hind neck, back and rump are light fulvous-brown, as are also most of the upper wing-coverts, there is only a slight indication of a dark brown wash at the tips of the ear-coverts, and the patch of bright yellow plumes on the sides of the neck is much smaller; all the under surface is dull greyish-white faintly tinged with yellow, and the feathers on the upper breast are washed with pale fulvous-brown.

It will be seen from the preceding notes that the breeding season extends from August until the end of December, and that this Honey-eater, like others, breeds again in the autumn, Dr. A. Chenery having observed fully fledged young in May, and Mr. Edwin Ashby procuring young birds in the same month.

Ptilotis auricomis.

YELLOW-TUFTED HONEY-EATER.

Muscicapa auricomis, Lath. Ind. Orn., Suppl., p. xlix. (1801).

Ptilotis auricomis, Gould, Bds. Austr., fol., Vol. IV., pl. 37 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 511 (1865); Gadow, Cat. Brit. Mus., Vol. IX., p. 242 (1884).

ADULT MALE—General colour above olive-brown; upper wing-coverts and quills brown, externally washed with olive-yellow; tail feathers brown, edged with olive-yellow, all but the central pair margined with white at the tip on the inner web, these margins increasing in extent towards the outermost feathers; forehead, crown of the head and nape olive-yellow; lores, feathers above and below the eye, sides of the head and the ear-coverts jet-black; a tuft of lengthened plumes behind the ear and the throat rich gamboge-yellow, the bases of the feathers on the chin and centre of throat blackish, forming a broad streak; remainder of the under surface brownish-yellow, the margins of the feathers on the fore neck and chest bright yellow, giving these parts a distinctly striped appearance; the sides of the body tinged with olive; centre of the abdomen and under tail-coverts dull yellow; bill black; legs and feet dull grey; iris dark-brown. Total length in the flesh 7.85 inches, wing 3.4, tail 3.5, bill 0.55, tarsus 0.9.

ADULT FEMALE—Similar in plumage to the male, but slightly smaller. Wing 3.15 inches.

Distribution—Southern Queensland, New South Wales, Victoria.

THE range of the Yellow-tufted Honey-eater extends throughout South-eastern Queensland, Eastern New South Wales into Victoria, as far south as the Melton District. I first observed it in the latter State in the sapling-scrubs around Bendigo, and have often noted in the winter months both *Ptilotis ornata* and the present species frequenting the ornamental trees planted in the streets of that city. It is, however, far more abundantly distributed throughout the districts contiguous to the coast of New South Wales, and is the commonest species of the genus found in the neighbourhood of Sydney, and more especially in the western suburbs. Inland I have not met with it in the open forest country beyond the western slopes of the Blue Mountains, nor have I seen an example of it in any collection found in the western portion of the State. Adult males from different parts of New South Wales are similar in colour, the wing measurement varying from 3.25 to 3.5 inches. There is a beautiful yellow variety of this species in the collection obtained by Dr. E. P. Ramsay, at Dobroyde, on the 30th January, 1864, and one of three similar birds observed by him in the neighbourhood that season.

It is a resident species in New South Wales and evinces a decided preference for gum-saplings and other scrubs, studded here and there with the larger *Eucalypti*, among the leafy sprays of which it may be often seen swaying to and fro while engaged in searching for insects or other food. During the autumn months it assembles in small flocks, sometimes quarrelling or playfully



YELLOW-TUFTED HONEY-EATER.

chasing one another from tree to tree. On one occasion I observed one of these birds catch hold of the outer primaries of another bird while perched and extend the wing to its utmost. This action it repeated several times with either wing also the tail feathers, following the bird from branch to branch and tree to tree until lost to view. It is a tame and sociable species, breeding freely in the saplings at the back of my house at Roseville, and coming fearlessly to bathe in a shallow dish of water placed for them every day during the summer months in the garden. Both here and in shallow rock-pools in creeks in the bush, I observed that this species stands in the water which it beats with its wing like *Ptilotis fusca*, and differing from *Meliornis nove-hollandia*, which simply darts down into the water and out again

as quickly as possible. How well these birds knew where to look for water when the receptacle for their use had been removed, is proved by the fact that I saw one of them, at 5 a.m. on the 31st December, 1904—an unusually hot and sultry day—hovering beneath, and with bill thrust up an absolutely dry tap in my garden, which had not been used since the previous day.

The food of this species consists of nectar extracted from various flowers, principally from blossoms of the *Eucalypti*, also to a large extent, insects. In the latter respect it is a most useful bird, for on sultry evenings at Roseville, when the Termites swarm, I have seen numbers of these birds in cleared parts of the scrub, engaged in capturing these destructive insects, securing them while on the wing after the manner of the Flycatchers. It searches too under the bark of the larger trees for insects, hopping from limb to limb while so engaged like *Collyriocincla harmonica*. Although it cannot be regarded as a very destructive species, I once saw two of these birds among others, that had been shot while eating date-plums in a neighbouring orchard.

It is impossible to convey by words any idea of the succession of varied and high-pitched notes usually uttered by this species. When searching for insects among the leafy twigs of trees, a single shrill "twixt" is emitted at intervals.

The nest is a cup-shaped structure, outwardly formed of strips of bark, spiders' webs and cocoons matted up together, the inside being lined with finer strips of bark, a few thin dried grass stalks, feathers, downy seeds, or a small quantity of horse or cow-hair. Fragments of newspapers and pieces of string and rags are often used in its outer construction, and small flowers are sometimes used as a resting place for the eggs: the walls of some nests too are much thicker than others. Usually it is built at the junction of a thin forked horizontal branch, or among vines, to which the rim is securely fastened, and within a few feet of the ground. Gum saplings and low Turpentine trees or a tangled mass of vines overrunning any low bush or tree are favourite nesting sites. At Ashfield and Canterbury I have frequently found nests in dwarf tea-trees,



NEST AND EGGS OF THE YELLOW-TUFTED HONEY-EATER.

a garden at Ashfield, also contained an egg of the Pallid Cuckoo.

I found the nest and eggs figured, at Roseville on the 25th August, 1905. The nest was unusually high, being built twelve feet from the ground near the top of a gum sapling, overrun with the white flowering vine *Tecoma australis*. Another found on the same day about fifty yards away, was placed in a similar position. These nests varied in size, one measuring three inches and a half in diameter by three inches in depth, and internally two inches and a half in diameter by two inches in depth. The other measured three inches in external diameter by four inches in depth, the inner cup measuring two inches and a quarter in diameter by two inches in depth.

The eggs usually two, sometimes three in number for a sitting, are oval or elongate-oval in form, the shell being close-grained, smooth, and almost lustreless, and vary considerably in size,

colour, and character of their markings. Some types are undoubtedly among the most beautiful eggs of any Honey-eater. Typically they are of a fleshy-buff ground colour, which passes into a warm reddish-buff on the larger end, where it is spotted and blotched with rich purplish-red intermingled with similar underlying markings of purplish-grey. Others have the ground colour of a uniform fleshy-buff and the markings consisting of spots, short streaks, and small blotches of purplish-red distributed over the surface of the shell, but predominating on the thicker end where they form an irregular zone. Of a very beautiful type is a set now before me with the ground colour almost pure white with a broad clouded band on the thicker end of rich dark red. I have another distinct type of a pale fleshy-buff ground colour, zoned around the larger end with indistinct spots and dots of a slightly darker shade of the ground colour. The eggs of this set, taken at Canterbury, on the 23rd November, 1892, are unusually small and closely resemble in colour and size the eggs of *Ptilotis keartlandi*. Length (A) 0.82 × 0.6 inches; (B) 0.8 × 0.61 inches. A set of two taken at Canterbury on the 14th November, 1892, measures:—Length (A) 0.89 × 0.72 inches; (B) 0.88 × 0.68 inches. This set also contains an egg of the Pallid Cuckoo. A set of three taken at Roseville, on the 3rd August, 1902, measures:—Length (A) 0.95 × 0.65 inches; (B) 0.94 × 0.65 inches; (C) 0.96 × 0.66 inches.

Fledgelings are brown above with only a slight tinge of olive, the wings and tail duller in colour than the adult, the forehead and occiput being slightly washed with olive-yellow, lores, sides of head and ear-coverts blackish; lengthened plumes behind the ears and feathers on sides of throat very pale olive-yellow; all the under surface olive-brown the centre of the breast and abdomen dull olive-yellow; bill and gape yellow; tip of bill and a line extending below the nostril brown; legs flesh-colour; iris blackish-brown. Wing 2.3 inches. This description is taken from an example I caught at Roseville on the 12th October, 1901. I have seen fully grown young birds being fed in the bush, which were indistinguishable in colour from the adults.

This species is one of the earliest breeders near Sydney, nests with eggs or young being common at the latter end of July or early in August, although occasionally I have found them as early as the middle of June. I have frequently discovered them when searching for the nests of *Psophodes crepitans*, in August, the normal breeding season continuing until the end of January, when two or more broods are reared. Odd nests may be found, but not often, from February to June. In company with Mr. Frank Hislop on the 28th January, 1899, a nest with two fresh eggs was found at Middle Harbour. Several scores of the nests of this species have been examined with eggs or young, but unless the eggs were remarkably handsome, or of an unusual variety, like those of many other common species they were seldom taken. A nest I found on the 12th August, 1905, in some vines close to my fence at Roseville, contained a recently hatched young one, which left the nest a fortnight later. When a month old it was caught in one of the outhouses, and was then barely distinguishable from the adult in plumage. It was remarkable that the bird did not wander farther away from where it was reared. For six weeks its almost incessant note, *zip, zip*, could be heard all day long as it followed its parents about for food.

Ptilotis cassidix.

HELMETED HONEY-EATER.

Ptilotis cassidix (Jard.), Gould, Proc. Zool. Soc., 1866, p. 558 (*nomen nudum*).

Ptilotis cassidix, Gould, Suppl. Bds. Austr., fol. Vol., pl. 39 issued in Part IV., 1st Dec. 1867.

Ptilotis leafbeateri, McCoy, Ann. Mag. Nat. Hist., 3rd Ser., Vol. XX., No. 120, p. 442, pub. 1st Dec., 1867.

ADULT MALE.—General colour above including the wings and tail blackish-brown, more or less tinged with olive; the outer webs of the quills and tail feathers externally edged with olive-yellow; all but the central pair of the latter having whitish tips, increasing in size towards the outermost feather on either side, under surface of the tail feathers including the tips of a silky sheen and washed with pale yellow; forehead and centre of the crown of the head and nape bright olive-yellow, the feathers on the forehead and anterior portion of the centre of the crown suberect, forming a slight crest; lores, feathers above and below the eye, ear-coverts, sides of the head and upper portion of the neck, glossy-black; partially concealed by the ear-coverts is a lengthened tuft of bright gamboge-yellow plumes; cheeks and throat bright gamboge-yellow, the bases of the feathers on the centre of the throat blackish, forming a more or less well defined stripe; remainder of the under surface and under tail-coverts rich yellow washed with olive, which is more pronounced on the fore neck, upper breast and sides of the body; bases of the long flank feathers dark grey. Total length 8.5 inches, wing 4.1, tail 4.2, bill 0.5, tarsus 1.

ADULT FEMALE.—Resembles the adult male but is paler on the upper parts, and smaller. Wing 3.6 inches.

Distribution.—Eastern Victoria.

THE Helmeted or Subcrested Honey-eater was first recognised as a distinct species by the late Sir William Jardine, on whose behalf Gould exhibited the then only known specimen, under the name of *Ptilotis cassidix*, at the December meeting of the Zoological Society in 1866. It was a bare name only, unaccompanied by any description. In the following year Gould first characterized and figured it in Part IV. of his "Supplement to the Birds of Australia," published on the 1st December, 1867. Sir Frederick (then Professor) McCoy's description of the same species was published in "The Annals and Magazine of Natural History," on the same date under the name of *Ptilotis leadbeateri*. He there remarks:—"This splendid new Honey-eater. . . I have great pleasure in naming after my able and zealous taxidermist at the Melbourne National Museum, whose great ability and diligence well deserve the compliment." Among the specimens in the Australian Museum collection is one received from the late Sir Frederick McCoy, and labelled "*Ptilotis leadbeateri*, McCoy, Subcrested Honey-eater, Victoria."

From the preceding species *Ptilotis cassidix* may be distinguished by its larger size, darker upper parts, richer yellow under surface, the conspicuous whitish tips to most of the tail feathers, the feathers on the forehead, and the anterior portion of the centre of the crown are suberect forming a slight crest, the sides of the head and upper portion of the neck are black, and the tuft of bright gamboge-yellow plumes below the ear-opening is longer.

Individual variation exists in this species; an adult male in the Australian Museum collection apparently a very old bird, has the entire upper parts, wings and tail rich brownish-black, with the faintest trace only of an olive-yellow wash to the edge of the outer webs of some of the quills and the basal portion of the tail feathers; the crest, centre of crown, nape and all the under parts are all of a deeper olive-yellow than in typical specimens. Wing 4 inches.

Many years after it was described, the late Mr. John Leadbeater, showed me skins in the National Museum, Melbourne, obtained near the mouth of the Bass River, on the eastern shore of Western Port Bay, and asked me to look carefully for this species during a trip I intended making to the Strzelecki Ranges, South Gippsland. At the time of my first visit, during the month of August, only small clearings had been made in the virgin undergrowth of these heavily timbered mountain ranges, and on my arrival at Childers I was surprised to find that *Ptilotis cassidix* was without exception the commonest bird in the bush. For a distance of twenty miles they were also noted along McDonald's Track on the top of the range. In habits, as I found out later on, they were precisely similar to *Ptilotis auricomis*, assembling in flocks from about ten to twenty in number, playing or squabbling as they chased one another

from tree to tree. They used to delight in congregating close together near the lower ends of long strips of bark pendant from the trunks of the larger *Eucalypti*, which swayed to and fro in every breeze, and from one of them three Helmeted Honey-eaters fell at the discharge of my gun. They were the first specimens I ever preserved and made into skins, one of which has been since mounted and is now in the Australian Museum. Many a time afterwards, in my early collecting days, did I swing myself pendulum-like on one of these long pieces of hanging stringy bark, either alone, or with one or more companions. A few years after this part of the country was settled upon, the aspect gradually changed. The tall straight stemmed *Eucalypti* were felled, their trunks split up into palings or posts and rails, and the thick undergrowth cut down and burnt off. The little that was left except in the beds of the creeks, or that had grown up again, was eventually cleared off by a devastating bush fire, and this species of Honey-eater was afterwards seldom seen.

I have received through Mr. G. A. Kearland, for examination, a set of two eggs taken by the late Mr. James Gillespie, at Olinda Creek, Lilydale, about twenty miles from Melbourne. They are oval in form, the shell being close-grained, smooth and lustreless, and are of a pale reddish-flesh ground colour, over which is sprinkled distinct dots, spots, flecks and small irregular shaped markings of chestnut and chestnut-red, predominating on the larger end, where the ground colour is of a slightly richer hue, intermingled with a few underlying spots of purplish-grey. On one specimen, some of the dots assume the form of an almost perfect circle, crossed through the centre with a distinct band of spots. Length (A) 0.94 × 0.65 inches; (B) 0.88 × 0.64 inches. The eggs of this species are indistinguishable from those of its close ally *Ptilotis auricomis*.

In the "Catalogue of Birds in the British Museum,"* Dr. H. Gadow records the habitat of *Ptilotis cassidix*, as "Victoria, South Australia, and interior of Australia." South-eastern Victoria, however, may be regarded as its almost exclusive habitat. I have seen specimens from many parts of South Gippsland, the vicinity of the eastern shores of Western Port Bay, but never from the western side, also from Lilydale about twenty miles east of Melbourne, and from the Dandenong Ranges. How far its range may extend in a north-easterly direction time alone will prove. Although somewhat similar country as it inhabits in Victoria, is found in the south-eastern portions of New South Wales, it has not been recorded from this State. The range of the Helmeted Honey-eater is undoubtedly the most restricted of any of the numerous species of the Family *Meliphagidæ* inhabiting the south-eastern portion of the Australian continent.

Ptilotis leucotis.

WHITE-EARED HONEY-EATER.

Turdus leucotis, Lath., Ind. Orn., p. xlv. (1801).

Ptilotis leucotis, Gould, Bds. Aust., fol., Vol. IV., pl. 36 (1848); *id.*, Handbk., Bds. Austr., Vol. I., p. 510 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 240 (1884).

ADULT MALE—General colour yellowish-olive: upper wing-coverts like the back; quills brown, edged externally with olive-yellow, the outer webs of the innermost secondaries dull olive-yellow; tail feathers brown, the central pair margined with dull yellowish-olive on both webs, the remainder margined on their outer webs only, tips of the lateral feathers white, increasing in size towards the outermost one on either side; forehead grey; crown of the head and nape grey streaked with black; lores and a line of feathers extending over the eye, sides of the head and nape black; ear coverts pure white; cheeks, throat and fore neck black; feathers of the breast and abdomen dull yellowish-olive

* Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 243 (1884).

broadly margined with yellow, passing into yellow on the centre, and dull yellowish-olive on the sides of the breast and flanks; under tail-coverts dull olive broadly margined with pale yellow; bill black; legs and feet deep greyish-black. Total length in the flesh 8 inches, wing 3.75, tail 3.75, bill 0.6, tarsus 0.9.

ADULT FEMALE—Similar in plumage to the male, but smaller, and the black feathers not extending quite so low down on the fore neck.

Distribution—New South Wales, Victoria, South Australia, Kangaroo Island, Western Australia.

JUDGING by the localities of specimens of the White-eared Honey-eater, contained in the Australian Museum, the Macleay Museum, the South Australian Museum, and the collection of Mr. Edwin Ashby, the exclusive habitat of this species is the southern portion of the Australian continent. Derby, North-western Australia; the Northern Territory of South Australia; and the Gulf of Carpentaria have also been included in its habitat,* which is undoubtedly an error, although its range may probably extend into the southern portions of Queensland. New South Wales and Victoria are its strongholds, becoming rarer in South and Western Australia, and it is not found in Central Australia. In New South Wales it inhabits the dry scrubby undergrowth near the coast, humid mountain ranges, and the mallee tracts



WHITE-EARED HONEY-EATER.

in the south-western portions of the State. As a rule specimens obtained in mountainous districts are larger than those obtained in flat and arid situations, and the black feathers extend lower down on the fore neck in the former. Mr. Edwin Ashby drew attention to this fact in the "Transactions of the Royal Society of South Australia,"† when referring to specimens collected by him at Callion, Western Australia, in August, 1901. Two of them I examined from the latter locality are however indistinguishable in size and the extent

of the black feathers on the fore neck from specimens obtained in Western New South Wales, the wing-measurement being alike 3.4 inches. An adult male obtained on the 6th October, 1901, by Mr. F. R. Zietz, at Kangaroo Island near the South Australian coast, is slightly larger, the wing-measurement being 3.5 inches, and the extent of the black feathers on the fore neck is greater than on the specimens previously referred to. The wing-measurement of the largest adult male now before me, obtained at Lithgow, on the Blue Mountains, New South Wales, at an elevation of 5,000 feet is 3.85 inches.

With three specimens forwarded to me for examination, Mr. Edwin Ashby of South Australia, sends the following note:—"The Victorian specimen was collected at Ballarat, a comparatively wet district, the other two at Callion, Western Australia, an arid locality with low scrub, *Cassia* and *Eremophila* bushes being the most common. I did not note it further west where the timber was larger, although of course it may have been there. I have never obtained a specimen in South Australia. It is remarkable that this species should be missing in suitable country in South Australia, and occur again in such a dry district in Western Australia." Writing later Mr. Ashby remarks:—"In April 1905, I obtained *Ptilotis leucotis* in the timbered

* Ramsay, Tab. List Austr. Bds., p. 12, (1888).

† Trans. Roy. Soc., S.A., Vol. XXV., p. 134 (1901)

country on Kangaroo Island, but it probably occurs commonly right up to Kingscote. This was interesting to me, as with the exception of one occasion, I have never seen this species in South Australia before, although I have heard that it is found in the Mount Gambier District."

Mr. G. A. Keartland also writes me as follows:—"During the journey of the Calvert Exploring Expedition, I frequently heard the loud notes of *Ptilotis leucotis* in the Acacias which clothe the sandhills near Lake Augusta, in Western Australia. The birds were, however, very wary, and owing to the fact that we were travelling as fast as possible, I only shot one, the skin of which was left with the abandoned collection at Johanna Springs."

In the neighbourhood of Sydney, although widely distributed the White-eared Honey-eater is the rarest species of the genus *Ptilotis*. It frequents the tea-tree and needle-bush scrubs about Parramatta River and Cook's River, and the large open tracts with a stunted vegetation about Middle Harbour, and is generally met with in isolated pairs. Except in the breeding season it is usually shy and wary, and especially in those situations where it cannot be approached unobserved. It is more numerous on the Blue Mountains, and in the thickly timbered portions of the Illawarra District. Mr. E. H. Lane has found it breeding on several occasions in the open forest country at Wambangalang Station near Dubbo, and there are several specimens in the Australian Museum collected by the late Mr. K. H. Bennett, at Moolah, and in different parts of South-western New South Wales. In Victoria I met with it in the ranges around Ballarat, also in the scrubby undergrowth on the shores of Port Phillip and Western Port Bays, where I found it breeding.

In spring it has a loud and distinct call resembling "chur-ruk, chur-ruk, chur-ruk, do-it-well, do-it-well," which when frequenting open situations, may be heard a considerable distance away. In autumn and winter, the first portion only is frequently repeated, and this is sometimes abbreviated to a short-sounding "choor, choor."

The stomachs of specimens examined contained the remains of insects, principally beetles. It is also destructive to cultivated fruits, and at Roseville I have seen this species shot with others, while attacking the summer fruits.

The nest is a deep cup-shaped structure, irregularly formed externally of strips of bark, bark fibre, and egg-bags of spiders, matted together with spiders' webs, the inside being lined with cow or horse-hair, opossum or rabbit fur, according to the situation in which it is built. In some nests obtained by Mr. E. H. Lane, on Wambangalang Station, wool was also used in their outer construction. A nest received from Frankston, Victoria, was more neatly made than usual, being externally formed of thin strips of greyish-white bark, matted together with cobwebs and egg-bags of spiders, and lined inside with horse-hair. It was through watching one of these birds, during a stay at Frankston in September 1888, plucking the hair from the backs of a pair of ponies in my sister's paddock, that I discovered their nest in a *Melaleuca* scrub close by, the completed nest and set of eggs being sent me later on. An average nest measures externally three inches and a half in diameter by two inches in depth; the inner cup measuring two inches and a quarter in diameter by two inches in depth. It is usually built between several thin upright branches or a fork, the bark of the sides of the nest being worked around the stems, at a height varying from three to eight feet from the ground, although at Cabramatta I have seen a nest as high as eighteen feet. In the neighbourhood of Sydney it is generally constructed in a tea-tree or needle bush. A nest in the Australian Museum Group Collection, built in a *Hakea acicularis* was found, when in company with Mr. Arthur Muddle, at Enfield, on the 1st September, 1895, containing two slightly incubated eggs, which the female was reluctant to leave until I had almost placed my hand upon her. A week later we found the same pair of birds building close by in another bush, but it was abandoned before completion.

The eggs are two in number for a sitting, oval in form, the shell being close-grained, and almost lustreless, and are subject to much variation even in the same set. Common types found in the scrubby coastal districts are either pure white, or a faint fleshy-white ground colour, sparingly and minutely dotted and spotted almost entirely on the larger end with faint reddish-chestnut, some specimens having only a few small dots on the larger end. Other types more often found in mountainous districts, are of a rich fleshy-buff, with numerous irregular-shaped penumbral spots, dashes, and irregular streaks of different shades of reddish-chestnut, some specimens having rich reddish-purplish markings, and a few underlying spots of a fainter shade. A set of two taken at Enfield, measures:—Length (A) 0·88 × 0·63 inches; (B) 0·92 × 0·63 inches. A set of two taken on the 9th November, 1894, at Colo Vale, New South Wales, measures:—Length (A) 0·92 × 0·65 inches; (B) 0·89 × 0·63 inches. A set of two taken at Frankston, Victoria, in September, 1888, measures:—Length (A) 0·88 × 0·62 inches; (B) 0·9 × 0·63 inches. A set of two taken by Mr. E. H. Lane, on Wambangalang Station, New South Wales, measures:—Length (A) 0·82 × 0·61 inches; (B) 0·83 × 0·6 inches.

Fledgelings differ from the adults in having duller plumage, the crown of the head is almost uniform in colour with the back; upper throat greyish-brown; lores, cheeks and lower throat dull blackish-brown; and the white ear-coverts are smaller. Immature birds may also be distinguished by being duller in colour, the smaller white ear-coverts, and the black feathers not reaching so low down on the fore neck.

The breeding season usually commences in August, and continues until the end of January. Mr. R. J. Etheridge showed me a set of two eggs, almost on the point of hatching that he had taken at Concord, on the Parramatta River, on the 25th August, 1893, also a partially incubated set taken by him on the 1st September following. Mr. E. H. Lane brought me nest, eggs, and skin of parent for identification that he had taken on Wambangalang Station in October, 1892. I obtained nests with fresh eggs in September, and noted fledgelings at the latter end of October and again at the end of January, proof that at least two broods are reared in the breeding season. Dr. E. P. Ramsay found a nest containing a fresh egg at Manar, New South Wales, on the 5th January, 1864, and Mr. A. F. B. Hull sent me a note that his brother had taken a set of two fresh eggs at Blackheath, on the Blue Mountains, on the 9th January, 1904. At Middle Harbour on the 15th August, 1906, I saw two young birds well able to fly, being fed by their parents. It was a very dry autumn and winter, and several species of Honey-eaters had bred unusually early that year.

The White-eared Honey-eater is one of the foster parents of the Pallid Cuckoo.

Ptilotis cratitia.

WATTLE-CHEEKED HONEY-EATER.

Ptilotis cratitius, Gould, Proc. Zool. Soc., 1840, p. 160; *id.*, Bds. Austr., fol., Vol. IV., pl. 38 (1848).

Ptilotis cratitia, Gould, Handbk. Bds. Austr., Vol. I., p. 513, (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 243 (1884).

ADULT MALE—*General colour above dull olive-green; wings and tail brown, washed with olive-green, which is brighter on the outer webs of the quills and lateral tail feathers; crown of the head and ear-coverts dark silky-grey, followed by a tuft of bright yellow feathers; lores and remainder of sides of head dull black; sides of upper throat bright yellow, separated from the feathers below the eye and the ear-coverts by a fleshy wattle extending from the gape; remainder of the under*

surface dull olive-yellow, slightly brighter on the centre of throat and fore neck, paler on the abdomen and under tail-coverts, some of the latter having indistinct brownish centres; "bill black; legs and feet brownish-black tinged with olive; iris black; fleshy appendage on each side of the throat a beautiful lilac-colour" (Gould). Total length 6.8 inches, wing 3.4, tail 3.4, bill 0.78, tarsus 0.82.

ADULT FEMALE—Slightly smaller and duller in plumage than the male.

Distribution—Victoria, South Australia, Kangaroo Island, Western Australia.

THE present species was discovered by Gould on the 26th June 1839, on the ranges near the Upper Torrens in South Australia, and was described by him in the following year in the "Proceedings of the Zoological Society." It is restricted to the extreme southern portion of Australia, although like *Ptilotis leucotis*, and *P. plumula*, it has also been erroneously recorded as occurring in the coastal districts of the extreme northern portion of the continent. Mr. C. McLennan has noted it in different parts of the Wimmera District, in North-western Victoria, and where he found it breeding. From the Trustees of the South Australian Museum and Mr. Edwin Ashby I have received on loan specimens from South Australia and Kangaroo Island. There are specimens in the Australian Museum collection obtained by Mr. George Masters at Port Lincoln, South Australia, in September 1865, and at Mongup, Salt River, Western Australia, in January 1867. Dr. Cabanis,* who instituted the genus *Lichenostomus* for the reception of the present species, separates the Western Australian from the eastern birds under the name of *Lichenostomus occidentalis*, but in the specimens now before me collected by Mr. Masters, I am unable to distinguish any difference sufficient to warrant their separation.

From South Australia Mr. Edwin Ashby has kindly sent me the following notes:—"I have only met with *Ptilotis cratitia* on Kangaroo Island in this State. In March 1905 it was very numerous, frequenting the tall mallee round the township of Kingscote on the north side of Kangaroo Island, and there taking the place that *Ptilotis penicillata* does in the park lands around Adelaide. They were also plentiful in the bushes that grow on the coastal dunes for forty miles westward, but here I found them more shy than those observed in the neighbourhood of Kingscote. At the end of October 1905, I met with them in the bushes on the sand dunes at Middle River, but not in the numbers I saw them in the early part of the year at Kingscote. Several recently fledged birds were seen, and a nest believed to belong to this species found in an Aster bush four feet from the ground and containing a young one just hatched. I am afraid the old birds had been shot, for the young one died a day or so later. In habits *Ptilotis cratitia* resembles *Ptilotis sonora*, which is common in similar situations on the mainland opposite and among the sandhills of the Gulf of St. Vincent. It is remarkable that the comparatively narrow strait between Kangaroo Island and the mainland known as Backstairs Passage, should be the means of so thoroughly separating the two species."

A nest of this species in the Australian Museum collection, presented by Dr. Charles Ryan and taken by Mr. C. McLennan on Pine Plains Station, on the 12th November, 1906, in the Wimmera District, North-western Victoria, is a compact deep cup-shaped structure, externally formed of bark fibre, narrow strips of bark and grasses, held together with a small quantity of spiders' webs, the inside being thickly lined, particularly at the bottom with fine grasses, plant down, and a few small feathers. Externally it measures two inches and three-quarters in diameter by three inches in depth, the inner cup measuring two inches in diameter by two inches in depth.

A set of two eggs in Dr. Charles Ryan's collection, taken from the above described nest, are oval in form, and somewhat rounded at the smaller end, the shell being close-grained, smooth and lustrous. They are white, one specimen being minutely and sparingly dotted with chestnut-brown on the larger end; the other, with the exception of a very few almost invisible dots of

* Cab. Mus. Hein., Theil I., p. 119, note 1850.)

chestnut-brown on the larger end is devoid of markings. Length (A) 0·83 × 0·59 inches; (B) 0·81 × 0·57 inches. The eggs of this species more nearly resemble a small and lightly marked variety of those of *Ptilotis leucotis*, or those of *Glycyphila fulvifrons*.

Ptilotis keartlandi.

KEARTLAND'S HONEY-EATER.

Ptilotis keartlandi, North, Ibis, 1895, p. 340; North and Kearl., Rep. Horn Exped. Centr. Austr.,

Part II., Zool., p. 93, pl. 6 upper fig. (1896); *id.*, Trans. Roy. Soc. S.A., Vol. XXII., p. 148 (1898); North, Vict. Nat., Vol. XVII., p. 187 (1901); Hartert, Nov. Zool., Vol. XII., p. 233 (1905).

ADULT MALE—*General colour above pale brown washed with olive-yellow, passing into yellowish-buff on the rump and upper tail-coverts, the latter more distinctly margined with olive-yellow; upper wing-coverts like the back, slightly darker in the centre, the lesser series tinged with grey; quills brown strongly washed with olive-yellow on their outer webs, the apical portion of some of the longer primaries and the tips of the secondaries narrowly edged with dull ashy-white; tail feathers brown, dull whitish around their tips, the central pair margined on both webs, and the remainder edged on their outer webs with olive-yellow; forehead, crown, and sides of the head dull grey passing into greyish brown on the nape and hind neck, which is slightly washed with olive-yellow; lores, feathers in front and below the eye blackish; ear-coverts dark silky-grey; extending behind and partially concealed by the lower end of the ear-coverts is a conspicuous tuft of bright yellow feathers; cheeks, chin, throat, and under surface pale yellow, the lower throat and fore neck of a distinctly richer yellow, each feather of the latter and those on the sides of the breast having a narrow indistinct line of brown down the centre; under tail-coverts pale yellow; under wing-coverts fulvous; bill black; legs and feet dark fleshy-brown; iris dark brown. Total length 5·9 inches, wing 3·3, tail 2·5, bill 0·57, tarsus 0·8.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Central Australia, North-western Australia, Northern Queensland.

THIS very distinct species, named after Mr. George Arthur Kearthland, was one of the novelties secured in 1894 by the Horn Scientific Expedition when in Central Australia. The first example was obtained in a gorge at Illamurta, as it came in company with *Emblema picta*, to drink at a small spring; another was procured at Davenport Creek. Later on Mr. G. A. Kearthland, while a member of the Calvert Exploring Expedition in 1896-7, again met with it, and obtained three adult males and a young male near Derby, North-western Australia. It was also observed by members of the same expedition south of Separation Well in Western Australia. Mr. Kearthland informs me that while in Central Australia he only saw single birds as they came to drink, also among the scattered mallee of portion of the Great Desert in Western Australia, but on Jilgelly Creek, and near Derby, North-western Australia, four or five birds were often noted feeding in a single tree, which were then just out in blossom at the end of April 1897. Two of the adult specimens have the basal portion of the lower mandible yellow. Wing 3 to 3·3 inches. The young male is duller in plumage than the adult, and the patch of yellow feathers below the ear-coverts is not so bright and well-defined. Wing 2·8 inches. It is remarkable that it was not met with in North-western Australia, by either Mr. E. J. Cairn or by the late Mr. T. H. Bowyer-Bower, who were collecting in the neighbourhood of Derby and the Fitzroy River in 1886. Judging by the number of specimens obtained by different collectors since, the north-western portion of the continent is the stronghold of this species. Dr. W. Macgillivray has kindly sent me for examination at various times, birds' skins collected by his brother Mr. A. S. Macgillivray, at Leilavale Station on the Fullarton River, near Cloncurry, in the Burke District, Northern Queensland. A small parcel received early in January, 1901,

contained among others, skins of *Ptilotis keartlandi*, *Myzomela nigra*, *Emblema picta*, *Ephthianura aurifrons*, thus extending the range of the present species across the northern portion of the continent.

Writing me in May, 1902, while resident at Point Cloates, North-western Australia, Mr. Tom Carter remarks:—" *Ptilotis keartlandi* is fairly plentiful in the ranges here and on the scrubby tableland behind them. I first noticed this bird in 1890, and sent a skin to Melbourne, as I thought then it was a new species, but was informed that it was *Ptilotis sonora*. It is an active little bird, much resembling in habits *P. leilavalensis* and *P. sonora*, and I have seen it in

company with the latter species and *Glycyphila ocellaris*, all busy probing the flowers of a tree. It appears to breed after rain at the end of summer. I have found fledgelings in April and took a nest with two incubated eggs, in the drooping leaves of a desert gum in May, 1900." While in Melbourne in November, 1895, Mr. G. A. Kearthland showed me a skin of *Ptilotis keartlandi*, that had been obtained by Mr. Carter in North-western Australia.

A nest of this species, taken by Mr. C. Ernest Cowle, in April, 1898, at Illamurta, Central Australia, is now before me. It is an open cup-shaped and very compactly built structure, outwardly formed of dried plant stems and grasses, firmly woven together with spiders' webs and cocoons, the inside being lined with a few wiry rootlets and a very thick layer of plant down. Externally it measures three inches and a half in diameter by two inches and a quarter in depth; the inner cup measuring two inches and a quarter in diameter by one inch and a quarter in depth. It was built about seven feet from the ground in the thin leafy stems of a *Cassia phyllodinea*, to which it is firmly secured by the rim on one side and the upright twigs on the other.

The nest figured was taken on the 20th April, 1900, near the Fitzroy River, North-western Australia, and is much smaller than average nests taken by Mr. C. E. Cowle at Illamurta, Central Australia. It is built on one side against a thin three-pronged leafy branch, and is attached on the other to a very thin leafy stem,



NEST AND EGGS OF KEARTLAND'S HONEY-EATER

several of the leaves being pulled down and worked into the side of the nest. Externally it is formed of very thin dried grass stems matted together with silky plant down, the inside of the nest, except near the rim, being entirely lined with the latter material; it measures two inches and a half in external diameter by one inch and three-quarters in depth; the inner cup measuring two inches in diameter by one inch and a quarter in depth. This nest contained two eggs, which are now in the collection of Dr. Charles Ryan of Melbourne.

Mr. C. Ernest Cowle writes me from Illamurta, Central Australia:—"I took a nest of *Ptilotis keartlandi* with two fresh eggs in February, 1896, and another with two fresh eggs early in April, 1898. They were both built in young growth of mulga."

The eggs are two in number for a sitting, oval in form, the shell being close-grained, smooth and almost lustreless. They are of a fleshy-buff ground colour which is minutely dotted and irregularly spotted with faint purplish or chestnut-red, intermingled with a few underlying markings of light purplish-grey. Typically they are sparingly marked, but in some the dots and spots are more numerous and predominate around the thicker end, where they form an irregular zone or cap; others are entirely devoid of markings. A set of two taken by Mr. C. E. Cowle, in April, 1898, measures:—Length (A) 0·72 × 0·5 inches; (B) 0·75 × 0·6 inches. The eggs of this species resemble those of *Ptilotis sonora* but are much smaller.

In January 1905, Dr. E. Hartert recorded² specimens from Marble Bar, Carbana Pool, and Taylor's Creek, North-western Australia, and thus describes a very young female;—"The upper surface is sandy or brownish-buff, the crown like the back, ear-coverts pale grey, under surface uniform yellowish-buff."

Ptilotis unicolor.

UNIFORM-COLOURED HONEY-EATER.

Ptilotis unicolor, Gould, Proc. Zool. Soc., 1842, p. 136; *id.*, Bds. Austr., fol., Vol. IV., pl. 46 (1848);

Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 249 (1884).

Stomiopera unicolor, Gould, Handbk. Bds. Austr., Vol. I., p. 523 (1865).

ADULT MALE—*General colour above and below pale greyish-brown, darker on the upper parts which are faintly tinged with olive, and slightly lighter on the abdomen and under tail-coverts; upper wing-coverts and quills brown with paler brown margins, some of the inner primaries externally edged with dull olive; tail feathers brown, indistinctly edged on their outer webs with olive for two-thirds of their length; a slightly curved line of blackish-brown extends from the nostril to the anterior portion of the eye; "bill dark olive-brown; naked gape fleshy-white passing into yellow at the corner of the mouth; legs and feet light ash-grey; iris obscure red"* (Gilbert—Gould). *Total length 8·2 inches, wing 4, tail 3·5, bill 0·7, tarsus 1.*

ADULT FEMALE—*Similar in plumage to the male but smaller. Wing 3·6 inches.*

Distribution—North-western Australia, Northern Territory of South Australia, North Queensland.

THE present species is widely distributed in the coastal districts of the northern portion of the Australian continent. It was discovered by Gilbert near Port Essington, where later on Mr. Alex. Morton also succeeded in obtaining specimens on behalf of the Trustees of the Australian Museum. Other examples in the latter collection were procured by Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower at Derby, and by Mr. G. A. Keartland near the junction of the Fitzroy and Margaret Rivers in North-western Australia. Relative to this species Mr. G. A. Keartland writes me:—"Ptilotis unicolor is found in considerable numbers among the mangroves and other dense foliaged trees on the margin of the Fitzroy River. These birds are very active and noisy, and are nearly always on the move, feeding, bathing, or chasing other species. I never saw them away from the trees or bushes that skirt the banks of the river."

Mr. A. F. Smith writes me:—"Ptilotis unicolor used to come into our quarters at the Victoria Sugar Mill on the Herbert River, Queensland; they get very tame and will enter rooms to steal bread or drink milk if left uncovered. Their notes resemble 'chp chp chp chp chp chwerp,' sounded very quickly. They used to breed in the mangoes around the house. I found three nests in mango trees from eight to fifteen feet up, but only took one egg which had been

² Nov. Zool., Vol. XII., p. 233 (1905).

apparently deserted about a month, from a nest on the 12th June, 1903. A pair of Fantails (*Sauloprocta melaleuca*) used often to try and build in a tree in front of the house, but as fast as they built these Honey-eaters would pull it to pieces; sometimes they would let them get as far as laying the eggs, and would then destroy the nest."

A nest of this species received from Mr. Charles French, Junr., is a deep cup-shaped structure formed throughout chiefly of pieces of yellowish-white inner bark of a *Melaleuca*, with which is intermingled a small quantity of fibre, and on the outside spiders' web. It is suspended by the rim to a drooping leafy fork, the nest being higher at the junction of the fork than the opposite side measuring externally five inches and a half, and on the lower side four inches by three inches and a half in diameter, the inner cup measuring two inches and a quarter in diameter and the average depth two inches and a half. This nest was taken from a drooping branch of a tree near the Daly River, in the Northern Territory of South Australia, on the 29th January, 1902, and contained two eggs. Mutilated skins were also received with the nest.

The eggs are two in number for a sitting, oval in form the shell being close-grained, smooth and slightly lustrous. They vary from pure white to fleshy-white, some specimens being minutely dotted, spotted, and sparingly blotched with red and purplish-red and fainter underlying markings of the latter colour predominating chiefly on the larger end but not confluent, or assuming the form of a zone. This type is not unlike the eggs of *Monarcha melanopsis*. Others with the exception of a few small dots are heavily blotched on the larger end with red and purplish-red, some of the markings appearing as if beneath the surface of the shell. Length (A) 0.9 × 0.67 inches; (B) 0.88 × 0.67 inches.

Genus PLECTORHYNCHUS, Gould.

Plectorhynchus lanceolatus.

LANCEOLATED HONEY-EATER.

Plectorhyncha lanceolata, Gould, Proc. Zool. Soc., 1837, p. 153; *id.*, Bds. Austr., fol. Vol. IV., pl. 47 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 525 (1865).

Plectorhynchus lanceolatus, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 208 (1884).

ADULT MALE.—General colour above greyish-brown with broad blackish-brown centres to the feathers on the back, these darker centres less distinct on the scapulars and rump, and reduced to a narrow shaft-streak on the upper tail-coverts; lesser and median upper wing-coverts greyish-brown, the latter whitish at the tips; greater wing-coverts and quills brown externally margined with light greyish-brown which passes into almost pure white around the tips; feathers on the crown of the head and nape greyish-white, centred with blackish-brown; ear-coverts, sides of neck and hind neck white, streaked with blackish-brown; chin and throat white; remainder of the under surface and under tail-coverts dull white, some of the feathers on the sides of the fore neck partially black, more particularly on their outer webs, those on the breast, sides of the abdomen, and the under tail-coverts having a very narrow brown shaft-streak; bill dark bluish-brown colour, lighter at the base of the lower mandible; legs and feet light slaty-blue; iris brown. Total length in the flesh 8.8 inches, wing 4.5, tail 4, bill 0.75, tarsus 1.05.

ADULT FEMALE.—Similar in plumage to the male.

Distribution.—Queensland, New South Wales, Victoria, South Australia.

THE present species, which may be distinguished by the long lanceolate feathers on the fore neck, is chiefly an inhabitant of the inland portions of the eastern States. Among examples in the Australian Museum collection are specimens obtained by Mr. George

Masters at Gayndah, on the Burnett River, and by Mr. K. Broadbent on the Darling Downs, Queensland, and numerous specimens procured on the Lachlan River, and at Moolah Station by the late Mr. K. H. Bennett, and by Messrs. E. J. Cairn and R. Grant at Bourke in Western New South Wales. At West Narrabri I found this bird breeding freely in November 1896, and obtained nests with fresh eggs, newly hatched young, and also procured fledgelings about six weeks old. In November 1897, in company with Mr. J. A. Thorpe, the Taxidermist, specimens were also obtained at Moree, but it was far less numerous than at Narrabri. Usually it was met with in pairs, frequenting chiefly the *Eucalypti* and the Bastard Myalls or "White-woods" (*Atalaya hemiglauca*), and their cheerful notes were often heard in the trees in the garden and around the house. While Mr. Thorpe was engaged in skinning, on several occasions these birds used to come and drink at a tap, only a few feet away from where we were seated.

Stomachs of the specimens obtained at Moree, contained only the remains of insects, principally small beetles. With a specimen in the flesh, forwarded to the Trustees of the Australian Museum by Mr. C. F. Bolton, in March 1894, the following note was sent:—"This bird occurs in small flocks of three or four in the neighbourhood of Wagga during March, and is very destructive to grapes, picking a hole in each one but not eating any of it. Their notes are very loud and resembles 'chirp, chirp, cherry, cherry.'"

The late Mr. K. H. Bennett, who collected the greater number of the specimens of the Lanceolated Honey-eater in the Australian Museum collection, writes as follows:—"Plectorhynchus lanceolatus is widely distributed throughout the clumps of trees scattered over the plains, and in thickly timbered country between the Lachlan and Darling Rivers in South-western New South Wales. As a rule it is generally met with singly or in pairs, but I have on several occasions seen flocks numbering from ten to twelve individuals. Although I have had considerable experience of this bird, I never yet knew of its feeding on the nectar of flowers, its food consisting so far as my observations go, entirely of insects. The nest, a deep cup-shaped structure, is placed at the extreme end of some drooping branch, frequently only a few feet from the ground. No bird defends its nest with greater pertinacity than the present species, hawks, crows, and even man being attacked with the utmost fury. Meanwhile the bird keeps up a shrill whistling note, occasionally alights on some neighbouring branch, and moves its tail feathers up and down much after the manner of the White-winged Chough (*Corcorax melanorhampus*.)"

The nest is a deep cup-shaped structure, formed of thin dried grasses, coated externally with plant down or wool, often so thickly with the latter material that the thin grasses forming the inner walls are entirely hidden. An average nest measures externally four inches in diameter by four inches and a half in depth, the inner cup measuring at the rim, which is often slightly contracted, three inches in diameter, and the depth three inches and a half. It is slung to thin drooping leafy twigs or branches, the structure usually not being flat at the rim but running up into several points where it is fastened to the branches, giving it a festooned appearance. One of the most beautiful nests I have seen of this species was received from Mr. Charles French, Junr., and taken by Mr. Charles McLennan on Pine Plains Station in the Wimmera District, Victoria, in September 1902. It is of the usual deep cup-shaped form and constructed of thin dried grass stems, plant down and a few white feathers woven together, the lining consisting principally of fine dried grass stems. Firmly worked into the upper portion of the structure is a number of Emu tail-feathers, the ends of which would partially obscure the bird while sitting, others stand out at nearly right angles over the rim or gracefully droop down the sides. It is attached to the thin leafy twigs of a species of *Eucalyptus* and it contained eggs in an advanced stage of incubation. At West Narrabri all the nests I found were built in Sandal-wood trees or in "Belars" (*Casuarina glauca*), one of the latter of which is now mounted with the birds, in the Group Collection. The nests were all placed in the terminal ends of drooping lateral branches, those in the "Belars" averaging about fifteen feet in height, and up

as high as thirty feet in the Sandal-wood trees. At Louth, Western New South Wales, Mr. Edward Lord Ramsay found nests with fresh eggs in September and October 1889, built in mulgas and ironwoods at an average height of fourteen feet. In the Dubbo District Mr. E. H. Lane informs me that he found three eggs to constitute the usual sitting, and only in one instance did he find four.

The eggs are usually three or four in number for a sitting, elongate-oval in form although thick ovals are sometimes found, the shell being close grained, smooth, and lustreless, or nearly so. They are of a dull white ground colour, which may be thickly freckled, spotted, or minutely blotched with pale chestnut-red, intermingled with underlying fainter markings of lilac-grey. Some specimens have the markings uniformly distributed over the shell, in others they predominate or are confined entirely to the larger end, where they sometimes form a cap or zone, and some are almost devoid of markings. The latter on a set now before me, consist of numerous but almost invisible pepperings or dustings of light chestnut-red and dull lilac-grey, and are confined entirely to well defined bands on the larger ends. A set of four in the Australian Museum collection, taken on the 17th November, 1886, by the late Mr. K. H. Bennett, at Ivanhoe, New South Wales, measures:—Length (A) 0·86 × 0·67 inches; (B) 0·87 × 0·68 inches; (C) 0·87 × 0·68 inches; (D) 0·97 × 0·67 inches; the latter a typical sized elongate-oval specimen, is almost devoid of markings. Another set of four taken by Mr. Bennett on the 18th October, 1889, on Yandenbah Station, measures:—Length (A) 0·97 × 0·69 inches; (B) 0·95 × 0·7 inches; (C) 0·95 × 0·69 inches; (D) 0·98 × 0·7 inches.

A nestling in the Australian Museum collection has the general colour above fulvous-brown with brownish-black centres to the feathers, those on the nape, hind neck, and sides of the neck having whitish margins; upper wing-coverts and quills dark brown, broadly margined with fulvous at the tips; tail feathers fulvous with brown centres; all the under surface white, with narrow brown shaft streaks on some of the feathers on the breast. Wing 2·4 inches. Attached to this specimen is the following note by the late Mr. K. H. Bennett:—"Taken from the nest on the 2nd January, 1885, at Mossgiel, New South Wales. Unusually late; young leave the nest as a rule in November."

Young birds in the collection obtained by me at West Narrabri on the 9th November, 1896, resemble the adults, but the feathers on the under surface are more downy and not so lanceolate in form on the fore neck. Wing 4 inches.

September and four following months constitute the usual breeding season of this species.

Genus MELIPHAGA, *Lewin.*

Meliphaga phrygia.

WARTY-FACED HONEY-EATER.

Merops phrygius, Lath. Ind. Orn., Suppl., p. xxxiv (1801).

Xanthomyza phrygia, Gould, Bds. Austr., fol., Vol. IV., pl. 48 (1848).

Meliphaga phrygia, Gould, Handbk. Bds. Austr., Vol. I., p. 527 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 221 (1884).

ADULT MALE—*General colour above black, the feathers of the back, rump, and upper tail-coverts broadly margined with pale yellow or yellowish-white, and of a slightly clearer white on the rump; upper wing-coverts black, the median and greater series margined on their apical portion with yellowish-white; primary coverts yellow; quills black, their apical portion externally margined with yellow, the second, third, fourth, fifth, and sixth primary with the apical portion of their outer webs entirely yellow, as*

is also a long crescentic patch on their inner webs, and separated only by the black shafts; central tail feathers black narrowly edged with yellow at the tips, the remainder yellow, black at the base, the black increasing in extent towards the central pair; head, hind neck, upper portion of mantle, throat and fore neck black; remainder of the under surface black, with a broad subterminal arrow-shaped yellowish-white marking on each feather; centre of the lower portion of the abdomen, the vent and under tail coverts yellowish-white; bill black; legs and feet fleshy-brown, dark slaty brown in front; bare space and warty excrescences around the eye dull yellowish-white; iris reddish-brown. Total length in the flesh 9.25 inches, wing 4.5, tail 4, bill 0.7, tarsus 0.85.

ADULT FEMALE—Similar in plumage to the male but slightly smaller.

Distribution—Queensland, New South Wales, Victoria, South Australia.



WARTY-FACED HONEY-EATER.

THE Warty-faced Honey-eater is one of the most beautiful birds inhabiting Australia; Shaw figuring it in his "General Zoology" in 1811 as the "Embroidered Bee-eater," from the conspicuous yellow margins to most of the feathers of the upper surface. Its range extends from Southern Queensland, throughout the greater portion of New South Wales and Victoria, into South Australia, where it is comparatively rare. Among a number of specimens now before me are two received on loan from the latter State, one from the Trustees of the South Australian Museum, obtained at Square Waterhole, Mount Lofty; the other procured by Mr. Edwin Ashby at Tea-tree Gully on the 27th June, 1900.

From its richly contrasted yellow and black plumage it is almost universally known in New South Wales as the "Mock Regent-bird." It is not stationary, but a nomadic species, roaming about the country sometimes in large flocks from fifty to a hundred individuals; at other times a few isolated pairs may be found in a district where once they were numerous, or they may be entirely absent for years. The first time I observed this species was in my early collecting days, when a flock numbering about one hundred, and flying high, arrived one morning from a southerly direction, and settled on the topmost dead branches of some tall *Eucalypti* growing in Albert Park, and close to the St. Kilda Railway Station. Apparently they had travelled some distance for they rested a time before dispersing over the Park, and where they eventually remained to breed. This was the only occasion that I obtained their nests and eggs in this locality.

Although absent some seasons I have noted this species in the neighbourhood of Sydney, at Ashfield, Canterbury, and Belmore, usually in small flocks in April and May, and in isolated pairs during August and September, when they were breeding. On arrival it is, however, more plentiful in the autumn months in the coastal districts between Narrabeen and Newport, and at Port Hacking. Open forest lands studded with *Eucalypti* when in flower are its favourite haunts. It occurs also in the Blue Mountains and in timbered flats beyond the range to the neighbourhood of Dubbo, but I have not seen it in the dry western portions of the State. In August 1887, Dr. E. P. Ramsay and I found it very common at Wellington and Dubbo, and we secured a number of specimens. In the same month ten years later, I noted it very common at Canterbury and Belmore, near Sydney. It is most combative in habits, fiercely attacking any other species that may intrude on its domain, and especially during the breeding season.

The note of the Warty-faced Honey-eater is a ringing metallic "clink-clank," and is frequently accompanied with a peculiar bowing of the head, also a clattering noise during flight, as if the wings were repeatedly being struck against each other.

Its food consists of the nectar and pollen of flowers, and insects. To this diet is frequently added cultivated fruits, principally figs and plums, also grapes. When once these birds sample a fruit they are very persistent in their endeavours to obtain it. At his residence at Springwood, on the Blue Mountains, the late Hon. Dr. James Norton, M.L.C., showed me a heavily-laden fig-tree in his orchard, thickly enveloped with netting, through the meshes of which a week before, he informed me, a Warty-faced Honey-eater had squeezed its way. Capturing the bird, although much damage had been done to the fruit, he thought it too beautiful to kill and restored it to liberty. Notwithstanding this, for the two following days the bird made vain attempts to again force its way through the netting.

From Copmanhurst in the Upper Clarence River District, New South Wales, Mr. George Savidge writes me:—"During my twenty years' residence here, I have only once met with *Meliphaga phrygia*. It was during a long spell of drought when a small flock settled on the top-most branches of a willow-tree in my garden."

Mr. J. C. McIntyre brought two specimens to the Australian Museum on the 13th July, 1905, and informed me that this species was not known locally at Muswellbrook, where it had lately appeared in large flocks, and was doing damage to the orchards.

Accompanying the specimen lent by Mr. Edwin Ashby was the following note:—"Meliphaga phrygia nest near Blackwood in South Australia. In 1904 I watched a pair feeding their young here. The old birds when uttering their note or double note have a peculiar swaying or bobbing motion, the head being stretched forward as if to assist in the production of their call."

The nest is a cup-shaped thick-walled structure, externally formed of strips of bark held together with a slight addition of cobweb and lined inside with fine dried grasses and shreds of bark. Nests now before me, taken at Ashfield and Belmore, near Sydney, have soft dried flowering stems worked into the outer portion of the structure, and the lining of the sides consisted entirely of the thread-like leaves of *Casuarina suberosa*, with a thick layer of shreds of red stringy-bark at the bottom of the structure only. An average nest measures externally four inches in diameter by two inches and a half in depth, the inner cup measuring two inches and a half in diameter by two inches in depth. Usually it is built between a thick upright forked branch, and frequently in the first fork at the top of a long rough-barked stem of a tree, also in slightly leaning upright forks, or on the top of a horizontal branch, as a rule a large portion of the structure being concealed. The height at which the nest is placed varies considerably. At Ashfield I had one under observation that could be seen from my window, and this nest, in which the young were successfully reared was fully sixty feet from the ground. The average altitude is from fifteen to thirty feet. The lowest positions I have seen the nests of this species was at Belmore near Sydney. One taken on the 14th August, 1898, containing two fresh eggs was built in the first thick fork of an Ironbark ten feet from the ground, the other taken on the 28th August, also containing two fresh eggs was seven feet from the ground, and placed on the top of a stem of a *Melaleuca* which had been cut off and the nest partially held in position by a number of thin dead stems. The position of the nest of this species as figured by Gould in his folio edition of the "Birds of Australia"² is misleading; it is never built on a slender thin forked branch as there represented.

The eggs are usually two in number for a sitting—on one occasion only have I found three—oval in form, the shell being close-grained, smooth and slightly lustrous. They are of a rich reddish-buff ground colour, becoming gradually darker towards the thicker end, and have

² Gould, Bds. Austr., fol. ed., Vol. IV., pl. 48 (1848).

numerous dots and spots of purplish-red and a few nearly obsolete underlying markings of violet-grey, in some specimens scattered entirely over the shell, but as a rule predominating or confined with the exception of a few small dots, almost entirely to the thicker end, where they are frequently confluent and assume the form of clouded caps or zones. A set now before me has the smaller ends very faint yellowish-buff. A set of two taken near Dubbo on the 27th November, 1892, measures:—Length (A) 0·96 × 0·7 inches; (B) 0·92 × 0·68 inches. A set of two taken at Belmore, near Sydney, on the 14th August, 1898, measures:—Length (A) 1 × 0·76 inches; (B) 0·99 × 0·77 inches.

Immature birds resemble the adults but are duller in colour, most of the quills are brown, where they are black in the adult, and all but the central pair of tail-feathers have brownish-black bases. Wing 4·2 inches.

August and the four following months constitute the usual breeding season of this species.

Mr. A. E. Ivatt brought me a set for examination, containing one egg of the Warty-faced Honey-eater, and one of the Pallid Cuckoo. These eggs he took at Glanmire, New South Wales, on the 12th November, 1894. Mr. Ivatt also found another nest of *Meliphaga phrygia* on the same day with two incubated eggs, and also a fresh egg of the Pallid Cuckoo.

Genus ACANTHOGENYS, Gould.

Acanthogenys rufigularis.

SPINY-CHEEKED HONEY-EATER.

Acanthogenys rufigularis, Gould, Proc. Zool. Soc., 1837, p. 153; *id.*, Bds. Austr., fol., Vol. IV., pl. 53 (1848).

Acanthogenys rufigularis, Gould, Handbk. Bds. Austr., Vol. I., p. 534 (1865).

Acanthochera rufigularis, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 265 (1884).

ADULT MALE—*General colour above including the crown of the head dull brownish-grey with dark brown centres to all the feathers, the margins of those on the back having a slight olive-tinge; rump and upper tail-coverts faint yellowish or straw-white with dark brown centres, becoming narrower and less distinct on the longer tail-coverts which are washed with grey; lesser upper wing-coverts like the back, the median and greater series, also the innermost secondaries dark brown with whitish margins, remainder of the quills dark brown, their outer webs with narrow whitish edges except the median series which are dull yellow; tail feathers blackish-brown tipped with white; a narrow line of feathers in front and extending below the eye, and the upper portion of the ear-coverts blackish-brown; spine-like feathers on the cheeks and partially concealing the ear-opening white, in some specimens yellow or partially yellow, those immediately behind the latter white with black bases, followed by a large patch of yellowish-white feathers, each with a streak of black down the centre: sides of fore neck and hind neck blackish-brown; chin, throat and fore neck fulvous, the small feathers below the cheeks having narrow whitish centres or blackish-brown cross-bars, remainder of the under surface dull yellowish-white, each feather with a tear-shaped marking of blackish-brown down the centre; under tail-coverts dull white or faint yellowish-white, centred with an acute angled patch of blackish-brown: apical portion of bill blackish-brown: base of bill, gape, and bare space below the eye fleshy-pink: ear-opening dull dark blue; legs and feet dark slaty-grey: iris blue. Total length in the flesh 10 inches, wing 4·4, tail 4·5, bill 0·78, tarsus 1.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia.

THE Spiny-cheeked Honey-eater is widely distributed over the Australian Continent. Mr. C. W. DeVis, M.A., records it as far north as Kimberley, at the mouth of the Norman River, Gulf of Carpentaria, Queensland, where Mr. K. Broadbent met with it in "small gums on sand-ridges," in July, 1883.* There are specimens in the Australian Museum collection obtained by Mr. George Masters at Port Lincoln, South Australia, in September 1865, and at Mongup, Salt River, Western Australia, in January, 1869. Mr. G. A. Kearnland informs me that he met with this species scattered over the greater portion of the route of the Horn Expedition in Central Australia, and of the Calvert Exploring Expedition, from Mullawa to near Separation Well in Western Australia, in which States he frequently found it feeding on the ground. It also occurs, he informs me, at times in the gardens and reserves of Melbourne in Victoria, and as far north as Tennant's Creek in the Northern Territory of South Australia.

In New South Wales, unlike Victoria and South Australia, the Spiny-cheeked Honey-eater does not occur in the coastal districts, but it is very common in the western portions of the State. There are numerous specimens in the Australian Museum collection, obtained by the late Mr. K. H. Bennett in the Lachlan District, in August 1883, and by Messrs. E. J. Cairn and R. Grant at Bourke, on the Darling River in 1888; I observed it at Coonamble. Specimens in the flesh have also been received from New Angledool, and one from Armidale on the 25th April, 1905, sent by Mr. G. P. Morse, who informs me that it was the only time he had seen it in that district.

Stomachs of these birds examined contained only the remains of insects. In addition also to the nectar of flowers, the late Mr. K. H. Bennett writes of specimens obtained by him in the Lachlan District, in 1883:—"Acanthogenys ruficularis is rather a scarce bird on the plains, but may occasionally be found in the pine-ridges and clumps of timber. Those I obtained were feeding on the berries of a parasite growing on the branches of low drooping trees on the sand-hills."

While resident at Hamilton in the Western District, Victoria, Dr. W. Macgillivray, kindly sent me the following notes:—"Acanthogenys ruficularis is a very useful insect destroyer, as I have often found their gizzards crammed full of beetles and other insects. During the latter part of the winter before last, several of these birds used to frequent an almond tree in my garden to feast upon its nectar-laden flowers, a proceeding which seemed to be thoroughly enjoyed, as the birds used at intervals during the meal, to throw back their heads and utter that delightful trilling note of theirs. A curious habit which these birds have in common with the White-plumed Honey-eater is that of soaring suddenly upwards from the top of some tree and at the same time uttering a little song, which seems to be reserved for such flights only, and then descending. I have not observed this habit in any other Honey-eaters."

Dr. A. M. Morgan sends me the following note:—"During a trip made in company with Dr. A. Cheney in August, 1900, from Port Augusta to Mount Gunson, South Australia, we observed *Acanthogenys ruficularis* very common in the scrubs. Three nests were found, one at Mount Gunson on the 31st July, built in a myall about fifteen feet from the ground, and two at Yultacowie Creek, on the 11th August, one in a "Black Oak," about four feet from the ground the other in a Pine about fifteen feet up. In each instance the nest contained two partially incubated eggs." Writing again after their trip from Port Augusta to the Gawler Ranges in August, 1902, Dr. A. M. Morgan remarks:—"Acanthogenys ruficularis was the commonest Honey-eater seen. It was present in all kinds of timbered country." Dr. A. Cheney sent an adult male on the 15th June, 1905, in the flesh, shot by him in the Flinders Range, twelve miles from Port Augusta, and writes:—"Acanthogenys ruficularis is common here. It may be seen in myall flats and in gums along the creeks, and is very tame when in numbers together. The

* Proc. Roy. Soc. Queensland, Vol. I, p. 156 (1884).

nests are generally built in the outermost branches of a myall, and I have taken them with eggs in August and September."

In May, 1902, Mr. Tom Carter wrote me as follows from Point Cloates, North-western Australia:—" *Acanthogenys rufigularis* is mostly a winter visitor here, but its peculiar gurgling notes may also be heard in the thickets in summer. It is rather shy in habits, and occurs more often in the mangroves."

Mr. C. G. Gibson also sends me the following notes from Western Australia:—"I found several nests of *Acanthogenys rufigularis* at Broad Arrow, in September, 1902, but in every instance with young. They were built in the hanging branches of a mulga or *Casuarina*, about ten feet from the ground. One nest contained two young ones and an addled egg. At the latter end of August and in September, 1903, at Lake Austin, this species appeared to have just finished breeding, as I saw a number of young birds about. At Tuckanarra on the 24th October following, I found a nest with two fresh eggs, but this was exceptionally late. In the vicinity of the Mount Margaret Goldfield, Erliston District, I found during 1905, the following nests:— On the 26th June, a nest in twigs of soft mulga with one egg. Two nests on the 24th July, built in prickly mulgas with two, and three fresh eggs, and another just completed from which I took two eggs four days later. Nests were also found on the 26th July with two fresh eggs in each, another on the 9th August building, and one on the 15th August with two eggs much incubated. These nests varied in height from three to ten feet from the ground, two being built in soft mulgas, the remainder in prickly mulgas."

Writing in 1884 in the "Catalogue of Birds in the British Museum,"* Dr. Gadow remarks of this species:—"Half the number of specimens examined by me have the terminal half of the bristles foxy-yellow, this cannot however be a sexual character, as it is independent of size and age." An examination of twenty-five skins now before me of different sexes and age, obtained in Queensland, New South Wales, Victoria, South Australia and Western Australia, show that the yellow spines are present more or less in twenty of them, but that they are not confined to the terminal half, some having them entirely yellow, others the upper half, or the basal portion; in one specimen from Armidale, New South Wales a few of the spines are distinctly yellow on one side only, the remainder of them and those on the other side pure white. Of those specimens having the spines pure white, four are adults, and one a young bird, the latter obtained near Port Augusta, South Australia.

Nests of this species in the Australian Museum collection, taken by the late Mr. K. H. Bennett at Mossgiel, are round cup-shaped and somewhat scanty structures, composed of long grasses and plant stalks, the latter bent into position when green and all held together with spiders' webs, and are attached at the rim to thin forked branches. A peculiarity in the nests of this species is that in many of them the grasses and stalks are not worked in horizontally around the structure, but perpendicularly, or obliquely from the rim to the bottom of the nest where they cross and recross each other. A nest taken by Mr. Edward Lord Ramsay at Wattagoona, New South Wales, is formed throughout of a fine wiry green vine held together with spiders' web. An average nest measures externally four inches in diameter by two inches and a half in depth, the inner cup measuring three inches in diameter by two inches in depth.

Eggs usually two, sometimes three in number for a sitting, oval or elongate-oval in form, the shell being close-grained, smooth, and slightly lustrous. In ground colour they vary from a pale yellowish-white to a creamy-brown, and are frequently of a darker shade on the larger end; they are somewhat sparingly spotted and blotched with umber-brown, or sepia and underlying markings of dull bluish-grey. Some specimens have the markings uniformly distributed over the shell, but as a rule they predominate or are confined almost entirely to the thicker end

* Gadow, Cat. Bds. Brit Mus., Vol. IX., p. 266 (1884).

and occasionally form there an ill-defined or irregular zone. Others have clusters of spots, and in two specimens now before me, they run in a nearly straight line down one side of the shell. A set of two taken by Mr. Edward Lord Ramsay, at Wattagoona, in October, 1887, measures:—Length (A) 1·05 × 0·71 inches; (B) 1·07 × 0·73 inches. A set of three taken in the same locality on the 19th November, 1889, measures:—Length (A) 0·97 × 0·71 inches; (B) 0·96 × 0·71 inches; (C) 0·96 × 0·72 inches. A set of three taken by Mr. C. E. Cowle, at Illamurta, Central Australia, measures:—Length (A) 0·96 × 0·72 inches; (B) 1 × 0·7 inches; (C) 0·97 × 0·7 inches.

Young birds resemble the adults but the centres to the feathers on the upper parts are duller in colour, rendering it more uniform; the spines are fewer and shorter on the ear-opening; the throat and fore neck is paler and the remainder of the under surface is less conspicuously streaked. Wing 4 inches.

As will be seen from the preceding notes, the breeding season in Eastern and Southern Australia extends over the latter half of the year, commencing early in July. Dr. A. M. Morgan and Dr. A. Chenery, finding a nest with incubated eggs at the end of that month. In the South Australian Museum, Adelaide, a nest lined with a little wool at the bottom was taken with one egg, near Robe, in January, 1897. In Western Australia Mr. C. G. Gibson noted young birds at the latter end of August, and found a nest with fresh eggs, on the 24th October. Mr. Edward Lord Ramsay took a nest with three fresh eggs in an Emu bush, on the 19th November, 1889, at Wattagoona, near Louth, New South Wales. Mr. C. E. Cowle informs me that in Central Australia, February, March and April constitutes the usual breeding season.

Genus *ANTHOCHÆRA*, Vigors and Horsfield.

Anthochæra carunculata.

WATTLED HONEY-EATER.

Merops carunculatus, Lath., Ind. Orn., Vol. I., p. 276 (1790).

Anthochæra carunculata, Gould, Bds. Austr., fol., Vol. IV., pl. 55 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 538 (1865); North, Ibis, 1906, p. 57.

Acanthochæra carunculata, Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 263 (1884).

ADULT MALE—*General colour above dark greyish-brown, each feather on the nape, hind neck and mantle having a narrow white shaft streak, which widens out on the scapulars and feathers of the back and rump into a long lanceolate white stripe; upper tail-coverts brown, with broad greyish-white margins; upper wing-coverts dark brown, the lesser series with a white shaft streak, the median coverts margined on the apical portion of their outer webs and tips with greyish white, and having narrow brown shaft streaks, the greater series margined on their outer webs with greyish-white; quills blackish-brown; some of the primaries narrowly edged near the middle of their outer webs with greyish-white and tipped with white, more largely on the second, third, fourth and fifth; the secondaries margined with greyish-white on their outer webs, increasing in extent towards the innermost which is margined on both webs; tail feathers blackish-brown tipped with white, the four central ones washed with grey, which is more distinct on the basal half of their outer webs; forehead and crown of the head blackish-brown, the latter with narrow indistinct brown shaft streaks, those on the hinder sides of the head with conspicuous white shaft streaks; lores and small feathers in front and below the eye silvery-white; ear-coverts blackish-brown, tipped with silvery-white; feathers on the cheeks blackish-brown with whitish centres, fleshy wattles behind the cheeks pinkish-red; on the sides of the hind neck a large patch of whitish-brown feathers passing into pale greyish-brown towards their tips; chin and centre of upper throat dull greyish-brown, all the feathers with broad indistinct whitish central streaks; remainder of*

the under surface greyish-brown, each feather having a central streak of white, those on the lower throat fore neck, and chest being narrow and more clearly defined and the sides of the feathers dark brown; centre of lower breast and abdomen yellow; under tail-coverts dark greyish-brown with white margins and shaft streaks and broad white tips; bill black; legs and feet fleshy-brown; iris brownish-red. Total length in the flesh 14.7 inches, wing 6.5, tail 7, bill 0.85, tarsus 1.5.

ADULT FEMALE—Similar in plumage to the male, but less in size, and having much smaller wattles. Wing 6 inches.

Distribution—Southern Queensland, New South Wales, Victoria, South Australia, Kangaroo Island, Western Australia.



WATTLED HONEY-EATER.

UNDER the names of "Gill-bird" and "Wattle-bird," the present species is well known to most residents of the parts of the Australian continent, in which it is found. Its range extends from the southern portion of Queensland, throughout the coastal districts and contiguous mountain ranges of New South Wales, into Victoria, South Australia, and West Australia. A specimen from King George's Sound in the Australian Museum collection, procured by Mr. George Masters in January, 1866, is smaller than examples obtained near Sydney. Mr. J. A. Thorpe informs me that he obtained this species at Ennogera in Southern Queensland, but it was by no means common.

The note of this species is a succession of guttural sounds difficult to syllabicate. During flight from one tree to another a short "kwock, kwock, kwock" is frequently uttered.

In the coastal districts of New South Wales it usually makes its appearance in large flocks in April and May, retiring again inland at the end

of winter to breed and remaining there throughout the summer. In some seasons it is scarce, but it was unusually plentiful in 1905 in the neighbourhood of Sydney, principally between Manly and Narrabeen and at Port Hacking. "Gill-bird" shooting is much indulged in, both for pleasure and profit, and these birds afford capital sport for they frequently take flight as one is approaching the tree they are in, or keep to the higher branches of the tall *Eucalypti*. Numbers of them may be seen exposed for sale in the poulterers' shops in Sydney during the late autumn months, for they are much esteemed as an article of food.

In the "Catalogue of Birds in the British Museum," Dr. H. Gadow writes Vigors and Horsfield's generic name as "*Acanthochera*," but as shown on reference to the original description in the "Transactions of the Linnean Society,"³ where the derivation is given, the name was written "*Anthochera*," the members of this genus delighting in flowers. Dr. Gadow follows Gould in placing *Corvus paradoxus* and the Wattle Crow of Latham as synonyms of the present species. In his key to the species, Dr. Gadow remarks of *Anthochera carunculata*:—"Length of wattles less than 0.5 inch," which is irreconcilable with Latham's description of the Wattle Crow—"caruncle ten lines in length."

The normal food of this species consists of nectar extracted principally from the blossom of different species of *Eucalypti* and *Banksias*, also various kinds of insects. Cultivated fruits,

³ Trans. Linn. Soc., Vol. XV., p. 320, (1826).

principally apricots and plums, are sometimes eaten by it in the summer months, and these birds are a nuisance some seasons in vineyards.

Dr. A. Chenery writes me from Port Augusta, South Australia:—"*Acanthochara carunculata* is not common here. A few pairs may be found in the gums on some of the creeks of Flinders Range and in the mallee belts along Spencer's Gulf. I have only found two nests; one of them on the 2nd October, 1899."

Mr. G. A. Keartland writes:—"*Anthochara carunculata* is found throughout the greater part of Victoria, but it is more numerous in the Ironbark forests. In Western Australia it is confined principally to the coast line; during the journey of the Calvert Exploring Expedition in 1896-7, this species was met with as far north as Mullawa."

The nest is a round open structure very irregularly formed externally of thin twigs, and lined inside with fibrous rootlets and pliant plant stems, and more often at the bottom with strips or shreds of bark. On the Blue Mountains the dried spiny stems of the Blackthorn are often used in its outer construction. Nests examined, taken in South Australia, were lined at the bottom with a small quantity of wool; another one had a few feathers intermingled with the wool. One in the Australian Museum collection taken by Mr. Richard Grant at Lithgow, averages externally seven inches and a half in diameter by three inches and three quarters in depth, the inner cup measuring four inches in diameter by two inches and a quarter in depth. The nest is usually built in an upright fork of a *Eucalyptus*, *Banksia* or other suitable tree. In Albert Park near Melbourne, I found them at a height varying from fifteen to forty feet from the ground, but around the shores of Western Port Bay, where they were common, they were nearly all built in gum saplings, several within hand's reach, and none higher than fifteen feet. In other situations, where they are seldom interfered with, as on the Blue Mountains, New South Wales, they are generally built within ten or twelve feet from the ground. Every symptom of alarm is exhibited by this species when one approaches close to its nest, running with outspread wings here and there over the ground or boldly dashing at an intruder and uttering harsh grating cries of distress. It is somewhat remarkable that these birds breed very freely close to the sea in Victoria, yet they retire from the coastal districts of New South Wales to breed further inland.

The eggs are two, sometimes three in number for a sitting, oval or elongate oval in form, the shell being close-grained, smooth and more or less lustrous. They vary in ground colour from a rich flesh or pale reddish-buff to a pale salmon-red, which is freckled and spotted with different shades of chestnut or purplish-red, intermingled with fewer and fainter underlying markings of dull violet-grey. As a rule the markings are of irregular shape and sometimes assume the form of short streaks and lines and usually predominate on the thicker end. On others they are rounded and often they have one or more spots or small blotches of yellowish-brown. A set of two taken by Mr. Robert Grant, on the 10th October, 1896, at Lithgow on the Blue Mountains, measures: Length (A) 1·26 × 0·89 inches; (B) 1·27 × 0·88 inches. A set of two taken by Mr. Richard Grant in the same locality on the 14th December, 1892, measures:—Length (A) 1·32 × 0·79 inches; (B) 1·32 × 0·79 inches. Another set was taken on the 7th January, 1897. An unusually elongated egg taken by Dr. E. P. Ramsay, at Manar, near Goulburn, New South Wales, measures:—Length 1·42 × 0·87 inches.

The breeding season commences in August and continues until the end of January. In New South Wales, nests with fresh eggs are more frequently found in September and October, and again at the latter end of November and December, showing that this species breeds at least twice during the season. Mr. Robert Grant informs me that these birds breed in large numbers around Lithgow, and that on one occasion he and his brother counted six of their nests in one wide spreading tree, but he was unable to say whether they were all tenanted or not. At Western Port, Victoria, nests with fresh or slightly incubated eggs were common in the early part of November, 1884.

Anthochæra paradoxa.

GREAT WATTLED HONEY-EATER.

Corvus paradoxus, Lath., Ind. Orn. Suppl. p. xxvi. (1801).*Anthochæra inauris*, Gould, Bds. Austr., fol. Vol. IV., pl. 54 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 536 (1865).*Acanthochæra inauris*, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 263 (1884).*Anthochæra paradoxa*, North, Ibis, 1906, p. 57.

ADULT MALE.—Forehead, crown of the head, hind neck and mantle blackish-brown, each feather broadly margined at the sides with greyish-white, giving these parts a distinctly streaked appearance; back brown, each feather having a paler shaft and indistinct greyish-white margins; rump brownish-grey with paler margins, the upper tail-coverts similar but of a clearer grey; upper wing-coverts and quills blackish-brown, some of the greater coverts and primaries narrowly edged, and the latter also tipped with greyish-white, more largely on the third, fourth, fifth, and sixth primaries, the secondaries margined externally with greyish-white more broadly on the innermost series; tail feathers blackish-brown, tipped with white, more largely on the outermost on either side, the central pair washed with grey, except near the shaft; feathers above and behind the eye dull white, small feathers below silvery-white with black bases, a few similar feathers also being scattered over the otherwise bare space between the eye and the ear-opening, below which is a long pendulous yellow wattle; cheeks dull white with blackish bases to the feathers; chin and upper throat white, the apical portion of the feathers lanceolate, hair-like and slightly recurved, as are also those on the centre of the lower throat and fore neck, but which have blackish-grey bases: sides of the lower throat and fore neck blackish-grey with indistinct silvery tips visible in certain lights: remainder of the under surface dull greyish-white with a lanceolate brown marking in the centre of the apical portion of each feather; centre of the lower breast and abdomen bright yellow; vent and lower flanks brownish-white, the feathers of the latter long, soft and downy; under tail-coverts dull white, brown in the centre: "bill black; legs and feet flesh-colour; iris brownish-black" (Gould). Total length 17.5 inches, wing 7.4, tail 10, bill 0.82, tarsus 1.57.

ADULT FEMALE.—Similar in plumage to the male but smaller, and having comparatively shorter wattles. Wing 6.4 inches.

Distribution.—Tasmania and some of the adjacent Islands: King Island, Bass Strait.

THIS species was originally described by Latham in his "Index Ornithologicus," under the name of *Corvus paradoxus*, but the habitat was erroneously recorded as New Zealand. It is an inhabitant of Tasmania, and some of the adjacent islands, and has also been found by a party from the Field Naturalist's Club of Victoria, on King Island in Bass Strait. From *Anthochæra carunculata* of the Australian continent it may be at once distinguished by its larger size, longer wattles, the white margins to the feathers of the head, hind neck and mantle, and its more greatly cuneiform tail.

I cannot understand how Gould could refer the *Corvus paradoxus** of Latham to the Wattled Honey-eater (*Anthochæra carunculata*) of Australia. It was founded by Latham on the "Wattled Crow" of his 'General Synopsis of Birds.'† In the latter description Latham remarks:—"The feathers at the top of the head and neck edged with whitish, on the cheeks a little downy, at the bottom of which arises a cylindrical caruncle ten lines in length, hanging on each side of the neck; throat white. . . .; tail greatly cuneiform, each feather tipped with white." The length of the wattle alone, which is much shorter in the Australian species, would preclude it from being the Wattled Honey-eater (*Anthochæra carunculata*), and in other respects

* Suppl. Ind. Orn., p. xxvi (1801). † Gen. Syn. Bds., Suppl. ii., p. 119.

it disagrees with Latham's original description of the latter species. The *Corvus paradoxus* of Latham is the Great Wattle Honey-eater of Tasmania, figured and described by Gould many years afterwards in his folio edition of the 'Birds of Australia'¹⁰ under the name of *Anthochaera inauris*. In the text opposite to the plate of this species in his folio edition of the "Birds of Australia" Gould gives it the same vernacular name, Wattle Honey-eater, as he does to *Anthochaera carunculata*, on the following plate. This error he corrected in the Index to the volume in which it is contained, distinguishing the Tasmanian species by the very appropriate and distinctive vernacular name of Great Wattle Honey-eater. Unfortunately in his "Handbook to the Birds of Australia" he omits the corrected name, and the same mistake occurs again as in the text to his plates.

Of the specimens in the Australian Museum collection. Mr. George Masters procured examples near the Dee River, in March, 1867, and there is a large number of skins obtained by Mr. Kendal Broadbent at Badger Head, in 1879.

Mr. R. N. Atkinson writes me from Waratah, Mount Bischoff:—"In this district *Anthochaera inauris* is only met with in the thickly timbered open country. It frequents chiefly the *Eucalypti* and is much sought after as a table delicacy. Its note is loud, harsh and guttural, and can be heard a long distance away. I have been informed by kangaroo hunters that these birds peck off and eat the fat which has been left on the kangaroo and wallaby skins, when they have been spread out on bushes to dry. My uncle the Rev. H. D. Atkinson found a nest of this species at Evandale. It was a large open nest of sticks and twigs, built in a tea-tree, and contained young birds."

Mr. Malcolm Harrison writes me:—"From my experience *Anthochaera inauris* is principally found in the nesting season in the higher midlands towards the Lake country. Nevertheless it does occasionally breed in the low country, and I have seen the nests and taken eggs within a few miles of Hobart. The nests were large open structures, composed of strips of bark and small twigs bound together with wool, the latter material also being used as a lining. The egg cavity is deep and large in proportion to the size of the bird. Two or three eggs are laid for a sitting. A nest I took on the 28th August, at Nubeena Quarantine Ground, Brown's River Road, within six miles of Hobart, contained two slightly incubated eggs. Another nest containing two eggs, taken with the help of Mr. A. L. Butler, was found some three weeks later about a hundred yards from the former. Both the nests referred to were placed in the tops of gum saplings, the former about twenty-five feet and the latter about forty feet from the ground. One nest I saw was built in a *Casuarina quadrivalvis*. As other nests were found by me from which the young had flown in October, I take it that this species is an early breeder in comparison with most birds of the same locality."

The eggs are two or three in number for a sitting, oval in form, the shell being close grained, smooth, and lustrous. They are of a salmon-buff ground colour, over which is scattered dots, spots, and small blotches of reddish-brown or purplish-red, intermingled with similar underlying markings of purplish or bluish-grey, and predominating as usual on the larger end. On some specimens the markings are very faint and have a blurred or smeared appearance, or two or three of them are of a dark red, almost black. A set of two in the Australian Museum collection, taken in September, 1885, measures:—Length (A) 1·37 × 0·94 inches; (B) 1·35 × 0·95 inches. Another set taken by Mr. G. K. Hinsby, near Hobart, on the 20th November, 1896, measures:—Length (A) 1·23 × 0·88 inches; (B) 1·27 × 0·93 inches.

Young birds resemble the adults, but the margins of the feathers on the crown of the head and hind neck are pale brown and the central dark-brown streaks are not so sharply defined, the wattles are much smaller, and the under parts are less distinctly streaked, especially on the lower sides of the breast.

* Gould, Bds. Austr., fol. ed., Vol. IV, pl. 54 (1848).

Genus *ANELLOBIA*. *Cabanis*.*Anellobia mellivora*.

BRUSH WATTLE-BIRD.

Certhia mellivora, Lath. Ind. Orn., Suppl., p. xxxvii (1801).*Anthochaera mellivora*, Gould, Bds. Austr., fol., Vol. IV., pl. 56 (1848).*Anellobia mellivora*, Gould, Handbk. Bds. Austr., Vol. I., p. 541 (1865).*Acanthocheera mellivora*, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 264 (1884).

ADULT MALE.—General colour above including the crown of the head brown slightly tinged with olive, each feather having a narrow white shaft streak widening out into a small spot near the tip, the apical portion of the feathers on each side of the shaft-line dark brown; upper tail-coverts brown with duller shaft-lines and white crescentic tips; lesser and median upper wing-coverts dark brown with white shaft lines widening out into a small white spot at the tips of the latter, the greater coverts dark brown, indistinctly margined with grey on their outer webs and tipped with white; quills dark brown tipped with white, more largely on the second, third, fourth, and fifth primaries, the innermost secondaries washed with grey and the central quills externally margined with olive; basal portion of inner web of primaries rufous, increasing in extent towards the innermost; tail feathers dark brown tipped with white, the four central feathers washed with olive-grey, the remainder, except the outermost on either side with an olive-grey tinge on the margins of the outer webs; sides of the forehead and feathers at the base of the lower mandible blackish, ear-coverts and feathers on the sides of neck dull silvery-white with blackish-brown bases; chin and throat dusky-greyish-brown with small brown tips to all the feathers; feathers on the fore neck and upper breast blackish-brown, greyish at the base and having a white central streak, remainder of the under surface similar, but the white central streaks are broader and widen out into a white spot at the tips of the feathers; the blackish-brown markings on each side of the feathers are almost obsolete on the lower flanks; under tail-coverts brown margined and largely tipped with white; bill black; legs and feet greyish-brown; iris grey. Total length in the flesh 12 inches, wing 5.4, tail 6.5, bill 1.63, tarsus 1.63.

ADULT FEMALE.—Similar in plumage to the male, but smaller. Wing 4.7 inches.

Distribution.—Queensland, New South Wales, Victoria, South Australia, Tasmania.

THE Brush Wattle-bird is freely distributed over the coastal districts of South-eastern Australia, and is likewise found in Tasmania. Both of Latham's descriptions in his "Index Ornithologicus"* are applicable to it as the native name and habits will show. His first one of *Mereps chrysopterus*, founded on the Golden-winged Bee-eater of his "General Synopsis of Birds"† is somewhat of a misnomer and has been discarded for the later one of *Certhia mellivora*, published in the same work. It is apparent, however, why the former specific name was given, for in his description of the Golden-winged Bee-eater, he remarks, "greater quills darker than the others, four or five of the outer ones have the middle part of their inner webs for two thirds of a golden orange, the ends white." Of the "Mellivorous Creeper," on which his later name is founded, he writes:—"Inhabits New South Wales, and is called *Goo-goo-ruck*, is a common species, seldom seen but near the sea-shore, especially about where the natives resort, is a lively bird constantly in action, sucking honey, taking flies, or contending with other birds, two or

* Ind. Orn. Suppl., p. xxxiii (1801). † Gen. Syn. Suppl. Bds., p. 153

three of these will often rout a flock of Blue-bellied Parrots, with which they are often engaged. For the above information I am indebted to Mr. Lambert."

In New South Wales it is common in the coastal districts, its range extending inland to the Blue Mountains. Although it frequents, and sometimes breeds in the neighbourhood of Sydney it is far less numerous than *Anthochaera carunculata*. Gould states that at the time when he was in Sydney, the Botanic Gardens was visited by large numbers of these birds, and that two nests were taken with eggs from shrubs growing in the borders. It is now, however, a thing of the past, for during a twenty years residence I have never seen one of these birds in any of the public parks or gardens in the city. Specimens may be obtained at Hornsby, French's Forest, Middle Harbour and Manly, but it is more numerous in the *Banksia* scrubs about Port Hacking and National Park. I met with it still more abundantly distributed both in the Upper Clarence District, and near the Crooked River in the Illawarra District. In November 1884, I found it breeding freely at Hastings, Western Port, Victoria.

It utters a succession of harsh and guttural notes, which it would be difficult to convey any idea of, but when once heard, they could not easily be confounded with those of any other species. Caley, who lived at Parramatta in the early days of settlement in New South Wales, and who made the greater part of the collection of Australian birds in the collection of the Linnean Society of London,* informed Messrs. Vigors and Horsfield that he called this species "*Cookaycock*," from its uttering a sound like that word."

From Copmanhurst, on the Upper Clarence River, Mr. George Savidge writes me:—"*Anellobia mellivora* is fairly numerous here, wherever 'Honeysuckles' (*Banksia*) are found. It is fond of building in trees overhanging the river, and although I have found nests with two eggs, many others contained but a single egg, sometimes incubated; or a young bird. They are early breeders, and I have taken eggs in August, September, October and November."

Dr. W. Macgillivray when resident at Hamilton in the Western District, Victoria, wrote me as follows:—"*Acanthochæra mellivora* is much the commoner of the Wattle-birds, a pair made a prolonged stay in a gum tree opposite my house whence their harsh and discordant voices could be heard at all times. When on a visit to Portland on the 12th of November, I found a nest of this species in a low overhanging gum in a thickly timbered paddock. The nest which was not much larger than a Rufous-breasted Thickhead's was composed of fine twigs lined with soft bark, and contained two fresh eggs. It was only about three feet from the ground."

From Tasmania Mr. R. N. Atkinson sends the following note:—"I found a pair of *Anellobia mellivora* breeding at Evandale, on the 12th November, 1903. The nest, a cup-shaped structure, built of twigs and sparingly lined at the bottom with a few pieces of sheep's wool, was built in the top of a Pine about thirty feet from the ground and contained two slightly incubated eggs. My uncle, the Rev. H. D. Atkinson, found a nest on the 2nd October, 1891, in a tea-tree at Evandale, containing one young bird."

The nest is a deep saucer-shaped structure, outwardly formed of very fine twigs and lined inside with shreds of red stringy-bark; in some I have found cow-hair intermingled with it, in others the red fluffy-down of *Banksia* cones. An average nest measures externally five inches in diameter by two inches and three-quarters in depth, and internally three inches in diameter by one inch and a half in depth. The forked branches of gum saplings, tea-trees and "Honeysuckles" (*Banksia*) are favourite nesting sites, and all I have seen, both in Victoria and New South Wales were built low down, generally about six feet, some lower, and none higher than twelve feet. One I found at Gerrington, New South Wales, on the 13th October, 1889, built about three feet from the ground in a tea-tree close to the beach, the sitting bird was unusually reluctant to leave, and after almost lifting it off discovered two slightly chipped eggs.

* Trans. Linn. Soc., Vol. XV., p. 322 (1826).

The eggs are usually two, sometimes only one in number for a sitting, oval in form, the shell being close-grained smooth and lustrous. They vary from a reddish-buff to a reddish-salmon in ground colour, and are spotted and blotched with different shades, varying from a chestnut-brown to dark purplish-red and having fainter underlying markings of dull bluish-grey. Some specimens have short streaks, blurred blotches, ill-shapen figures, or scratches, in others the markings are penumbral. As a rule they predominate chiefly on the larger end where they occasionally assume the form of a cap or irregular zone. A set of two taken at Belmore, near Sydney, on the 18th August, 1899, measures:—Length (A) 1.05 × 0.78 inches; (B) 1.09 × 0.77 inches. A set of two taken by Mr. G. Savidge at Whiteman Creek, on the 7th September, 1895, measures:—Length (A) 1.13 × 0.78 inches; (B) 1.1 × 0.76 inches.

Young birds are dull brown above, clearer brown on the head, hind neck and upper tail-coverts with indistinct whitish shafts to the feathers; the quills have smaller white tips, the tail feathers are more strongly washed with olive than in the adult, but the lateral feathers only are tipped with white, ear-coverts and sides of the neck dark brown, all the feathers centered with silvery-white, all the under surface dull greyish-brown, the feathers on the fore neck having indistinct whitish shaft streaks.

The breeding season in New South Wales commences early in August, and continues until the end of January, during which time two broods are reared.

Anellobia lunulata.

LUNULATED WATTLE-BIRD.

Anthocheira lunulata, Gould, Proc. Zool. Soc., 1837, p. 153; *id.*, Bds. Austr., fol., Vol. IV., pl. 57 (1848).

Anellobia lunulata, Gould, Handbk. Bds. Austr., Vol. I., p. 543 (1865).

Acanthocheira lunulata, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 265 (1884).

ADULT MALE—*Differs from the adult male of ANELLOBIA MELLIVORA, in having a longer and narrower bill, the upper parts including the head brown, with darker brown centres to all the feathers, those on the back having indistinct whitish shaft streaks and tips, the upper tail coverts have a large white crescentic marking at the tip, the primaries are narrowly margined with white, the outer webs of the quills are buff or creamy rufous passing into greyish-white near the tips, the innermost secondaries are broadly margined on the apical portion of their outer webs and around their tips with greyish-white; the ear-coverts and sides of the neck are silvery-white as are also the tips of the feathers on the throat; there is a large amount of white on the lower portion of the under surface, the apical half of the feathers on the centre of the abdomen being entirely white; under tail coverts white with concealed brown bases. Total length 1.2 inches, wing 5.6, tail 6.2, bill 1.07, tarsus 1.1.*

ADULT FEMALE—*Similar in plumage to the male but slightly smaller. Wing 4.9 inches.*

Distribution—Western Australia.

THE Lunulated Wattle-bird is allied to the preceding species, and is an inhabitant of the South-western portion of the continent. In addition to its longer bill the absence of the distinct white central shaft-streaks on the head, hind neck and back, and the larger amount of white on the under surface, will readily serve to distinguish it from *A. mellivora*. There are specimens in the Australian Museum, collected by Mr. George Masters on behalf of the Trustees at King George's Sound, Western Australia, in March 1866. One of them, a female, is distinguished from the others in having a patch of pure white feathers on each side of the chest.

Mr. Masters informs me that he found this species frequenting the same situations near the coast as does its congener in Eastern Australia, and that it is precisely similar in habits.

A nest of this species in the Australian Museum collection, taken by Mr. Tom Carter, on the 6th July, 1906, at Broome Hill, Western Australia, is remarkably small in comparison with that of the Eastern species *A. mellivora*. It is an open saucer-shaped structure externally formed of very thin many branched plant stems, with which are intermingled a few twigs, the inside being lined with fine dried grasses, and at the bottom with shreds of bark, and on top of that a layer of *Zamia* wool. Externally it averages four inches in diameter by one inch and three-quarters in depth; internally it measures two inches and a half in diameter by one inch and a quarter in depth. Mr. Carter informs me that it was built in a White Gum sapling at a height of fifteen feet from the ground, and contained a single fresh egg, the usual number laid for a sitting.

The egg taken from the above described nest is an elongate oval in form, the shell being close-grained, smooth and slightly lustrous. It is of a reddish-buff ground colour, which is uniformly spotted and blotched with chestnut-red, intermingled with similar underlying markings of purplish-red and a few faint spots of purplish-grey. Length 1·16 × 0·8 inches.

As will be seen by Mr. G. Savidge's notes the eastern species *Anellobia mellivora* sometimes lays but one egg.

Genus TROPIDORHYNCHUS, Vigors and Horsfield.

Tropidorhynchus corniculatus.

FRIAR-BIRD.

Merops corniculatus, Lath., Ind. Orn., Vol. I., p. 276 (1790).

Tropidorhynchus corniculatus, Gould, Bds. Austr., fol., Vol. IV., pl. 58 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 545 (1865).

Philemon corniculatus, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 271 (1884).

ADULT MALE—*General colour above pale greyish-brown, of a slightly clearer brown on the mantle; wings and tail of a darker shade of greyish-brown, the latter tipped with white, the inner webs of the quills brown: head bare, except a few hair-like feathers at the base of a knob-like protuberance at the base of the upper mandible and a broken line of dark brown feathers extending in front of the eye, above which is a narrow line of short pale brown feathers; chin and throat dull white, all the feathers with narrow dark shaft lines: the feathers on the fore neck and chest lanceolate in form and of a silvery-white with a narrow dark brown shaft stripe, those on the fore neck being separated from the lower throat by a band of dusky-brown feathers; on the cheeks and occiput are some fine black hairs; breast pale brown passing into dull white on the abdomen and under tail-coverts; bill and bare skin of head dull black; legs and feet dark grey; iris red. Total length in the flesh 13·25 inches, wing 6·2, tail 5·8, bill from base of fore portion of knob-like protuberance on the upper mandible to tip 1·1, tarsus 1·25.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, Victoria, South Australia.

THE Friar-bird, or as it is more commonly called the "Leatherhead," was one of the birds first known to the early settlers in Australia, and is figured in White's "Journal of a Voyage to New South Wales," as the "Knob-fronted Bee-eater," from specimens collected near

Sydney in July 1788. In 1790 Dr. Latham characterised it in his "Index Ornithologicus," under the name of *Merops corniculatus*. Open forest lands are its favourite haunts, also humid mountain ranges. As regards the neighbourhood of Sydney, it may be considered as nomadic in habits, some seasons appearing in large flocks, at other times in isolated pairs, and more often is entirely absent. In January and February 1902, during a period of drought inland, it was unusually plentiful at Roseville, where I had not observed it before. Large numbers were shot in the orchards, where these birds were very destructive, eating all kinds of summer fruits, but principally pears and date-plums. They were extremely noisy, commencing to utter their discordant notes shortly after daybreak. At Roseville Railway Station, Mr. G. Savidge and I saw several feeding on the berries of the ink-weed. Belmore is the nearest place to Sydney I have known it to breed, a nest being taken on the 14th October, 1899. It is more freely dispersed in some seasons between Blacktown and Penrith, is fairly numerous on the Blue Mountains, and is still more common in the open forest lands between the western slopes of the latter range and towards the border of the inland plains.



FRIAR-BIRD.

Mr. E. H. Lane writes me:—"Tropidorhynchus corniculatus is in places one of the commonest species in the Dubbo District, New South Wales. It is also the most pugnacious and noisy. I have seen these birds in such numbers that their notes have been almost deafening during the bright spring days. Notwithstanding their numbers, and although their nests are common enough, I have not found their eggs too plentiful for their nests are generally in situations, to be looked at rather than bothered with. I have never taken more than three eggs from a nest."

Mr. George Savidge writes me as follows:—"Tropidorhynchus corniculatus is plentiful everywhere about the Upper Clarence District, and in winter I have seen it congregated in large flocks. These birds often give *Eudynamis cyanocephala* great beatings, making the feathers fly out of the latter. On the other hand I have seen the Cuckoos chase the

Leatherheads away, and they were undoubtedly masters when they chose to be so. During dry seasons, I have seen the Leatherheads on the ground feeding on grasshoppers. These birds may be frequently observed feeding the young of Flinder's Cuckoo."

In some of their habits the Friar-birds resemble *Myzantha garrula*, for when disturbed they usually resort to the dead branches at the top of some lofty tree, and utter many varied babbling and querulous notes, pitched in different keys.

Their normal food consists of nectar and pollen of flowers, extracted principally from the blossom of the *Eucalypti*, and insects. Stomachs of specimens examined, procured in September, were crammed entirely with the remains of black beetles. The fruit-eating propensity of this bird is well known to most orchardists and vignerons of Eastern Australia, the soft summer fruits and grapes being principally eaten. During a conference of fruit-growers and vignerons held in Sydney in June 1890, Mr. Frauenfelder, a vignerons of Albury, stated that these birds were very destructive, and that in one vineyard in the district from seventy to one hundred Leatherheads were shot each day, and this lasted for ten weeks.

The nest is a large open cup-shaped structure, attached by the rim to a thin forked horizontal branch, which is usually entirely hidden by the nesting materials being well worked over it. Outwardly long narrow strips of red stringy-bark firmly woven together are more often used, with which dried grasses are intermingled, the inside being lined with the latter material. Others are built chiefly of wool and strips of bark, but lined inside with wiry plant stems or dried grasses. In addition to the two preceding types there is a nest in the Australian Museum collection, externally formed of broad pieces of tea-tree bark, bound round with strips of red stringy-bark, string, spider's webs, and bearded lichens, but lined with fine yellow dried grasses. An average nest measures externally six inches and a half in diameter by four inches and a half in depth, the inner cup measuring four inches and a quarter in diameter by three inches in depth. The nest is nearly always built at the extremity of one of the outermost branches of a gum tree, and usually well out of danger of being interfered with. At Narrabri and on the Upper Clarence I have seen them over fifty feet from the ground, but at Cooma and in the mountainous districts in the south-eastern portion of New South Wales I have been informed they are sometimes built almost within hand's reach, as also does *Oriolus sagittatus*, another species whose nests are usually placed well out of harm's way.

The eggs usually three, sometimes four in number for a sitting, vary considerably in shape and disposition of markings. Typically they are oval or elongate-oval in form, the shell being closed grained, smooth and lustreless, and of a reddish-salmon ground colour, spotted and blotched with light chestnut-red and pale violet-grey; in some the markings are very distinct, and predominate chiefly on the thicker end, in others they are of a slightly darker shade than the ground colour. Others have the ground colour of a very pale salmon, sprinkled over with almost obsolete spots and blotches of faint chestnut and violet-grey. An unusual set of four in the Australian Museum collection, taken by Mr. S. Robinson at Lewis Ponds, New South Wales, on the 3rd November, 1896, are of a very faint creamy-pink ground colour, with spots and dots of pale purplish-red uniformly distributed over the shell, and intermingled with similar underlying markings of dull violet-grey:—Length (A) 1.23 × 0.87 inches; (B) 1.21 × 0.87 inches; (C) 1.25 × 0.88 inches; (D) 1.25 × 0.85 inches. A set of three measures:—(A) 1.37 × 0.9 inches; (B) 1.44 × 0.92 inches; (C) 1.38 × 0.92 inches. A remarkably small and rounded set of two taken by Mr. John Ramsay at Cardington, in December, 1867, measures:—Length (A) 1.12 × 0.9 inches; (B) 1.14 × 0.88 inches.

Young birds resemble the adults, but have a much smaller protuberance on the upper mandible; many of the feathers on the upper parts are brown and are broadly margined with white at the tip, the feathers also extend right on to the nape, those on the latter part, as well as those above the eye, chin, and margin of the throat, are rich brown, those on the fore neck are shorter, less lanceolate in form and tipped with pale yellow; remainder of the under surface dull white, those on the sides of the body being long, downy, and washed with pale brown. Wing 6 inches.

A male, evidently immature, obtained by Mr. J. A. Thorpe, at Tarana, is of a distinctly greyer shade in the back, wings, and tail. This specimen is in the moult, some of the tail feathers being only half grown, the upper tail-coverts have white margins, the tips of the secondaries have narrow brown edges, and some of the tips of the primaries are white; there is a larger amount of white on the under surface, the sides of the breast being greyish-brown, tipped with white. Wing 6.2 inches.

In the neighbourhood of Sydney and in the Hawkesbury River District this species commences to build early in October, and fresh eggs were taken at Liverpool, on the 14th December, 1896. In the previous month of that year I found nests at Narrabri on which the birds were sitting, and in the Clarence River District Mr. Savidge informs me that the breeding season commences early in October, and continues until the end of January. Mr. H. G. Barnard

has taken sets of these eggs, in the Dawson River District, Queensland, on the 5th November and the 14th December, 1892. In Victoria I have seen it nesting at Yendon in October and November.

Tropidorhynchus buceroides.

HELMETED FRIAR-BIRD.

Philemon buceroides, Swains., Anim. in Menag., p. 325; Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 272 (1884).

Tropidorhynchus buceroides, Gould, Handbk. Bds., Vol. I., pl. 547 (1865); *id.*, Bds. Austr., fol., Vol. Suppl., pl. 44 (1869).

ADULT MALE—General colour above brown; wings brown, darker on the inner webs of the quills; tail feathers brown, slightly darker than the back, pale-brown around their tips and margins of the inner webs; sides of the head and neck mostly bare; feathers on the forehead, crown of the head, and occiput lanceolate in form, very pale brown or whitish-brown with slightly darker shafts, those on the upper portion of the hind neck somewhat similar but longer, not lanceolate, and slightly recurved forming a small ruff, and joined by a narrow band of short silvery-brown feathers at the sides to those on the fore neck; the lower portion of the hind neck is bare with the exception of a few short dusky downy feathers; the cheeks and some short bristle-like feathers partially concealing the ear opening blackish; chin, feathers on the centre of throat and upper portion of fore neck silvery-brown and lanceolate in form; remainder of the under surface pale brown; bill and bare parts of the head and neck black. Total length 12 inches, wing 6, tail 5, bill from hinder portion of elevated ridge on culmen 1.8, tarsus 1.75.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-eastern Queensland, some of the islands of Torres Strait.

THE Helmeted Friar-bird is an inhabitant of the coastal districts of North-eastern Queensland. It frequents the neighbourhood of the Mulgrave River, its range extending northwards to Cape York. In the Zoology of the "Chevert" * Mr. George Masters records a male and female obtained at Palm Island, and in the Report of the Voyage of H.M.S. "Alert," † Dr. R. B. Sharpe records a female from Thursday Island, Torres Strait, procured in July, 1881. Among others there are specimens in the Australian Museum collection obtained by Mr. J. A. Thorpe at Cape York in 1868, and by Mr. K. Broadbent and Mr. A. F. Smith at Cairns. It is common in the Bloomfield and Endeavour River Districts, localities from which I have received numerous sets of its eggs.

Gould's figure of this species in his Supplement to the "Birds of Australia" ‡ is that of an immature bird, for when fully adult the lower portion of the hind neck is bare with the exception of a few short downy feathers, and those on the upper portion do not lie down flat, as shown in the figure, but are slightly recurved forming a small ruff.

Mr. Frank Hislop writes me as follows of this species:—"The Helmeted Friar-bird generally appears in the Bloomfield River District about August after the first rains come and the 'Bloodwood' (*Eucalyptus corymbosa*) is in flower. They are found mostly on the low-lying flats and swamps, feeding on the nectar extracted from the blossom of the tea-tree. Insects and cultivated fruits also form portion of the food of this species. They are very pugnacious and frequently destroy the nests of other birds. A pair of White-bellied Cuckoo-shrikes (*Graucalus*

* Proc. Linn. Soc. N. S. Wales, Vol. I., p. 55 (1876).

† Rep. Voy. H.M.S. "Alert," p. 20 (1884).

‡ Gould, Suppl. Bds. Austr., fol., pl. 44 (1869).

hypoleucus), who had chosen a 'black-butt' near the house as a nesting site, had their nest and its contents on two occasions destroyed by a pair of Helmeted Friar-birds, who were breeding in the same tree. The nest is a large cup-shaped structure outwardly formed of strips of bark and bark fibre, and lined inside with very fine plant stems. It is suspended by the rim to a thin forked twig at the extremity of a horizontal branch, and almost invariably it is built in the same tree in which there is a nest of the Drongo-shrike or the Yellow-breasted Fig-bird. The trees most frequently selected as nesting sites are the 'black-butt' and Moreton Bay Ash. The breeding season lasts from October to the end of February. Eggs three to five, but generally four for a sitting."

The eggs are usually four in number for a sitting, and are extremely variable in shape, size, colour, and disposition of markings. They are oval in form, the shell being close grained, smooth, and lustreless. Typically they are of a faint reddish-white ground colour which is thickly freckled, spotted, and boldly blotched with different shades of red and light purplish-red, intermingled with similar underlying marking of lilac-grey, the markings usually predominating and being larger towards the thicker end. Others have a few light brown spots intermingled with the red or purplish-red blotches, while some have large confluent patches of light red distributed over the shell which is again blotched with purplish-red and dull lilac-grey, many of the different coloured markings overlying one another. A set of four taken by Mr. Bertie Hislop in the Bloomfield District, on the 10th December, 1894, measures:—Length (A) 1·26 × 0·91 inches; (B) 1·23 × 0·87 inches; (C) 1·18 × 0·88 inches; (D) 1·23 × 0·88 inches. A set of three taken in the same district, on the 18th December, measures:—Length (A) 1·18 × 0·93 inches; (B) 1·17 × 0·93 inches; (C) 1·18 × 0·95 inches.

Young birds may be distinguished by having the sides of the neck entirely covered with silvery-brown or pale brown feathers.

Tropidorhynchus argenteiceps.

SILVERY-CROWNED FRIAR-BIRD.

Tropidorhynchus argenteiceps, Gould, Proc. Zool. Soc., 1839, p. 144; *id.*, Bds. Austr., fol., Vol. IV., pl. 59 (1848); *id.*, Handbk. Bds. Aust., Vol. I., p. 548 (1865).

Philemon argenteiceps, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 272 (1884).

ADULT MALE—*Similar to TROPIDORHYNCHUS BUCEROIDES*, Swainson, *but smaller, and having the elevated ridge at the base of the culmen narrower and more rounded in form, the lanceolate feathers on the crown of the head, sides of the neck, chin, throat, and fore neck silvery-white; the bare space on the sides of the head is triangular in form, and the under parts are slightly paler than in T. BUCEROIDES. Total length 11 inches, wing 5·5, tail 4·5, bill from hinder portion of elevated ridge on culmen 1·36, tarsus 1·2.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, North Queensland.

THE present species was described by Gould from specimens collected by the late Mr. Bynoe on the North-western coast of Australia. Specimens also received later by Gould were procured in the inland portions of North-western Australia by the late Sir George Grey. Gould in all his descriptions states:—"Throat and all the under surface white." The latter in all the specimens I have examined is pale brown. Although widely distributed over the northern portion of the continent, the Northern Territory of South Australia is apparently the stronghold of this species. Specimens were obtained at Port Essington, Yam

Creek, and Port Darwin by Mr. Alex. Morton while collecting on behalf of the Trustees of the Australian Museum in January, 1879. Count Salvadori records it from Port Darwin from specimens procured there by Dr. L. Loria in 1889,* and from the same locality Dr. R. B. Sharpe enumerates a male of this species among the list of specimens collected during the Voyage of H.M.S. "Alert."† Dr. E. Hartert records‡ specimens from the Victoria River, Pine Creek, Brock's Creek, and the South Alligator River, all in the Northern Territory.

Writing me from Cooktown, Queensland, in June, 1900, Mr. Bertie Hislop remarks:—"I have never seen such flocks of Silvery-crowned Friar-birds as there are about here now. Their clatter among the blossom of the Bloodwood trees is almost deafening. These birds generally nest in broad-leaved *Melaleuca* trees."

A nest in the Australian Museum collection, taken by Mr. E. Olive near Cooktown, is a bowl-shaped structure externally formed of broad strips of bark, bark fibre, and spiders webs, lined inside with coarse grass stalks, the rim being firmly woven over a thick forked branch.

The eggs are two in number for a sitting, oval or elongate oval in form, in some specimens the shell being opaque, close-grained, smooth and as a rule almost lustreless. They vary from a dull fleshy-pink to a very faint creamy-buff, with numerous indistinct spots and blotches of pale red scattered over the shell, with which are intermingled similar underlying markings of dull violet-grey. A set of two taken by Mr. Bertie Hislop at Marton, near Cooktown, on the 2nd December, 1899, measures:—Length (A) 1·14 × 0·85 inches; (B) 1·2 × 0·81 inches. A set of two taken by Mr. H. W. Mant at the same locality, on the 14th February, 1901, are of light chalky-pink ground colour and have a few scattered and indistinct red and faint purplish-red markings distributed over the shell. Length (A) 1·16 × 0·84 inches; (B) 1·21 × 0·83 inches. A set of three in Mr. C. French, Junr.'s collection taken near the Daly River, in the Northern Territory of South Australia, on the 21st January, 1902, are of a pale creamy-buff ground colour, slightly richer in colour on the larger end, and dotted and spotted with chestnut-red intermingled with underlying markings of rich purplish-grey, predominating on the thicker end where in two specimens fairly well defined zones are formed. Length (A) 1·2 × 0·8 inches; (B) 1·15 × 0·8 inches; (C) 1·14 × 0·8 inches. A set of two received from Mr. E. A. C. Olive measure alike:—Length 1·27 × 0·86 inches.

Young birds resemble the adults, but all the feathers on the upper parts are margined with white around their tips, the upper tail-coverts too have a slight fulvescent tinge; the feathers on the sides of the neck are brown, and those on the throat dull white washed with yellow. Wing 5 inches.

The breeding season commences in October and continues until the end of February.

Genus PHILEMON, *Vieillot*.

Philemon citreogularis.

YELLOW-THROATED FRIAR-BIRD.

Tropidorhynchus citreogularis, Gould, Proc. Zool. Soc., 1836, p. 143; *id.*, Bds. Austr., fol., Vol. IV., pl. 60 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 549 (1869).

Tropidorhynchus sordidus, Gould, Bds. Austr., fol., Vol. I, Introd., p. lviii. (1848).

Philemon citreogularis, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 277 (1884).

* Ann. Mus. Civ. Gen., Vol. 29, p. 503 (1889).

† Rep. Voy. H.M.S. "Alert," p. 20 (1884).

‡ Nov. Zool., Vol. XII., p. 232 (1905).

Philemon sordidus, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 277 (1884) (Subsp.); North, Trans. Roy. Soc. S.A., Vol. XXII., p. 149 (1898).

Philemon occidentalis, Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., 2nd Series, p. 676 (1887).

ADULT MALE.—General colour above including the wings and tail pale brown, with a slight ashy shade, the inner webs of quills and also the outer series except a narrow margin of a darker shade of brown; the tips of the tail feathers whitish; forehead and crown of the head pale brown, sides of the head bare, lores and a narrow ring of feathers around the eye dark brown; chin and upper throat dull silvery-white, the feathers hair-like in form; chest very pale brown, the feathers having long bare shafts terminating in a white brush-like tip; remainder of the under surface pale brownish-white passing into a dull white on the abdomen and under tail-coverts; bill black; legs and feet black; bare space on sides of head dull bluish-grey; iris dark brown. Total length in the flesh 10 inches, wing 5½, tail 4·2, bill 1·05, tarsus 1·05.

ADULT FEMALE.—Similar in plumage to the male.

Distribution—Queensland, New South Wales, Victoria, South Australia, North-western Australia, Northern Territory of South Australia.

THE classification of Count Salvadori is followed here in referring the birds without the protuberance on the culmen to the genus *Philemon* of Vieillot, of which the type is *P. moluccensis*, while those with it are placed in the genus *Tropidorhynchus* of Vigors and Horsfield, founded on the Australian species *T. corniculatus*.

Some authorities separate Gould's northern form, *P. sordidus*, as specifically or subspecifically distinct from the present species. I question, however, very much the propriety of so doing, for neither its smaller size or larger bill, as I have shown elsewhere,* can be upheld as constant specific or even subspecific characters if a large series from different parts of the continent are examined. It is the rule that in a widely distributed species, examples from the northern portion of the continent are smaller than those procured in Southern Australia. Moreover, in the Report of "Voyage of H.M.S. 'Alert,'" Dr. R. B. Sharpe refers an example obtained at Port Darwin to *P. citreogularis*, and Dr. H. Gadow in the "Catalogue of Birds in the British Museum"† enumerates this specimen, also one obtained by the late Mr. M. Elsey in North-western Australia, under the name of *P. citreogularis*. If we accept these birds from Northern and North-western Australia as *P. citreogularis*, then it would be better to sink Gould's name of *P. sordidus* into a synonym of *P. citreogularis*. As some writers however, regard the northern race as distinct, my remarks on the two forms are kept separate.

The original description of *Philemon citreogularis* was taken from a young bird obtained in New South Wales. As Gould pointed out later in his folio edition of the "Birds of Australia," the yellow colouring of the throat is peculiar to the period of immaturity and is entirely absent in the adult.

Philemon citreogularis, Gould, is freely distributed in favourable situations throughout Southern Queensland and the inland portions of New South Wales, its range extending in the south-western portion of the latter State into the adjacent parts of Victoria and South Australia.

In New South Wales, open forest lands are its favorite haunts, and it is never found far away from permanent water. In August 1887 Dr. E. P. Ramsay and myself obtained specimens at Wellington and Dubbo. It was at that time unusually plentiful and was found feeding in company with *Meliphaga phrygia* and *Tropidorhynchus corniculatus* in the flowering *Eucalypti*. Like the former species, it is nomadic in habits, Mr. A. E. Hays sending a specimen to the Museum from Uralia in February 1902, where it had not been observed before. In New

* Trans. Roy. Soc., S.A., Vol. XXII., p. 150 (1898)

† Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 277 (1884).

South Wales it may be usually regarded as strictly an inland species, but during the great drought of 1902, Mr. H. Newcombe presented a young male he had shot at Kurnell, Botany Bay, on the 31st May. Another specimen procured at Pittwater, during the same month is the only other example I have seen obtained in the County of Cumberland. There are numerous specimens in the Australian Museum collection obtained by the late Mr. K. H. Bennett on the banks of the Lachlan River, and by Messrs. E. J. Cairn and Robert Grant near Bourke on the Darling River, five hundred and eight miles west of Sydney. From Queensland there are specimens procured by Mr. George Masters, at Wide Bay, in September 1870, also one specimen received from the late Mr. George Barnard of Daringa.

A nest in the Australian Museum collection, taken by Mr. E. H. Lane, at Wambangalang Station near Dubbo, in November 1899, is a cup-shaped thick walled structure, compactly formed externally of thin strips of bark and bark fibre, thickly lined inside with fine dried yellow grasses. Externally it measures five inches and a half in diameter by four inches in depth; the inner cup measuring three inches and a quarter in diameter by two inches and a quarter in depth. Usually the nest is built low down at the end of a drooping branch and frequently on one overhanging water.

The eggs are usually three, sometimes four in number for a sitting, oval or elongate oval in form, the shell being close-grained smooth and lustrous. They vary in ground colour from reddish-salmon to a faint purplish-red which is almost obscured by freckles, spots and fleecy markings of a light purplish-red, or of a darker shade than the ground colour. Others are distinctly spotted and blotched with purplish-red and purplish-grey, the markings predominating around the thicker end forming there an ill-defined zone. A set of three taken by Mr. H. G. Barnard, at Daringa, Queensland, on the 14th October, 1893, are conspicuously blotched and streaked with faint purplish-red on a pale reddish-white ground colour. A set of three taken by the late Mr. K. H. Bennett, near the Lachlan River in October 1882, measures:—Length (A) 1.15 × 0.8 inches; (B) 1.12 × 0.8 inches; (C) 1.03 × 0.75 inches. A set of three taken by Mr. E. H. Lane on Wambangalang Station, near Dubbo, on the 27th November, 1892, measures:—Length (A) 1.18 × 0.81 inches; (B) 1.11 × 0.82 inches; (C) 1.11 × 0.81 inches.

Young birds resemble the adults but the feathers are downy, the crown of the head, rump, upper tail-coverts and margins of upper wing-coverts and tips of the tail feathers are a pale buffy-brown, the outer webs of some of the secondaries are margined with greenish-yellow, the feathers on the hind neck are grey with small brownish tips; all the under surface very pale brown, slightly darker on the chest, some of the feathers on the sides of which are broadly tipped with yellow, throat yellow, crossed on the centre with an indistinct blackish-grey band. Wing 5 inches. Another young specimen has some of the feathers on the back and rump with whitish margins, the feathers on the chest have yellow centres and some of them small white tips. Wings 4.75 inches.

Gould separated *Philemon sordidus* from *P. citreogularis* on account of its smaller size and more developed bill. Five specimens from Port Essington, where the type of *P. sordidus* was obtained by Gilbert, have the bills of the same size as examples of *P. citreogularis* procured in New South Wales. They are, however, much smaller, the wing measurements varying in length from 4.55 to 4.7 inches. Four adult females and one immature male procured by Mr. G. A. Kearnland, near the junction of the Fitzroy and Margaret Rivers in North-west Australia have the bills larger than in *P. citreogularis*, and the wing measurement nearly alike, varying only from 4.95 to 5.05 inches. They are slightly paler brown above and whitish on the under surface and have that washed out appearance often seen in birds frequenting very hot districts. The specimens obtained by Mr. E. J. Cairn on the Lennard River in 1886, are slightly larger, and

the wing measurement varies from 5.25 to 5.45 inches. *P. occidentalis* is an immature specimen of this species. The type was procured by the late Mr. T. H. Bowyer-Bower near Derby, and is in precisely the same stage of plumage as the immature male of *P. sordidus*, obtained by Mr. Keartland, and from which it cannot be distinguished. Both specimens have all the feathers of the interscapular region edged with ashy-white, the outer webs of the inner primaries margined with greenish-yellow, a conspicuous patch of citron-yellow feathers on the sides of the lower neck, and only a faint tinge of yellow on the silvery-white throat. Immature specimens of *P. citreogularis* from Eastern and Southern Australia, differ in having a bright citron-yellow throat, and only a few feathers on the sides of the lower throat tipped with citron-yellow. Adult specimens of *P. sordidus* from North-west Australia can only be distinguished from *P. citreogularis* by their bleached appearance and slightly larger bill. The latter character is subject to much variation, especially in specimens obtained in different localities. In other respects the two birds are similar.

Mr. Keartland who met with *P. sordidus* in great numbers while encamped near the junction of the Fitzroy and Margaret Rivers,* writes as follows:—"In the neighbourhood of the Fitzroy River, and especially at Derby, these birds were very numerous. They seemed to require water as frequently as Finches and Pigeons, and dearly love a bath. Often whilst watching the different birds arriving and departing from the water troughs, I was amazed by the visit of one or more of these birds, whose sudden arrival caused the immediate dispersal of all other species from the water. It is very pugnacious and chases any intruders from the vicinity of its nest. Should an Owl be disturbed during the day, it is immediately noticed by a Friar-bird, and chased and worried for a great distance, during which time many other birds join in the hunt. Many of their nests were found near the river, but only two eggs obtained. The nests were made of coarse grass, cup-shaped, and placed in the drooping foliage of Eucalypts. When seen from below, they bore a strong resemblance to those of the Chestnut-eared Finch."

A nest received from Mr. G. A. Keartland, was built in the drooping leafy twigs of a Eucalyptus growing near the Fitzroy River. It is deep cup-shaped in form, and is outwardly constructed of dried grass stems and long strips of very fine bark-fibre, held together and worked over the twigs between which it is built with the outer covering of some composite plant, the inside being lined entirely with dried grasses. Externally it measures three inches and three-quarters in diameter, by five inches and a half in depth; internally two inches and a half in depth. An egg belonging to this species is of a very pale purplish-red ground colour, with a few rounded spots and dots of dark purplish-red on the larger end; while appearing as if beneath the surface of the shell are underlying spots of faint purplish-grey. Length 1.03 × 0.73 inch. Another specimen has dull purplish-red blotches uniformly distributed over the surface of the shell, except on one side, and the faint purplish-white ground colour almost obscured by numerous streaky markings of purplish-grey. Length 1.12 × 0.77 inches. A set of two taken by Mr. J. Harris near the Fitzroy River, in February 1899, measures:—Length (A) 1.05 × 0.75 inches; (B) 1.07 × 0.77 inches.

Typically the eggs of this northern form, are like the birds, smaller than examples from the southern portion of the continent.

Dr. W. Macgillivray, writes me:—"Philemon sordidus is plentiful about Cloncurry, North Queensland. It nests after the wet season, in April and March, laying usually four eggs."

* Trans. Roy. Soc., S.A., Vol. XXII., p. 151 (1898).

Genus ENTOMYZA. *Swainson.***Entomyza cyanotis.**

BLUE-FACED HONEY-EATER.

Gracula cyanotis, Lath. Ind. Orn., p. xxix (1801).*Entomyza cyanotis*, Gould, Bds. Austr., fol., Vol. IV., pl. 68 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 560 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 268 (1884).

ADULT MALE.—General colour above golden-olive; wings like the back, the lesser wing-coverts having a dusky wash, the inner webs of the quills except the innermost secondaries, also the apical half of the outer primaries, brown, the basal portion of the inner webs of most of the primaries broadly margined with pale fulvous; tail feathers golden-olive margined with white around the tips, except the central pair; sides of the head bare; forehead, centre of crown of the head, lores, and a broad line of feathers extending below the eye on to the ear-coverts and the hind neck black; sides of the occiput white; chin, throat, fore neck, and centre of chest dusky-grey; a line extending from the base of the lower mandible over the cheeks and along the sides of the neck, also the remainder of the under surface and under tail-coverts pure white; bill black, basal portion dark bluish-grey; legs and feet bluish-grey, bare space below the eye dark blue, above light greenish-blue; iris yellowish-white. Total length in the flesh 12 inches, wing 6·3, tail 5·3, bill 1, tarsus 1·25.

ADULT FEMALE.—Similar in plumage to the male.

Distribution.—Queensland, New South Wales, Victoria, South Australia.



BLUE-FACED HONEY-EATER.

LATHAM described this species in his "Index Ornithologicus" as *Gracula cyanotis*, a name founded on the "Blue-eared Grackle" of his "General Synopsis of Birds," from a specimen obtained at Botany Bay, New South Wales. This is an instance of a species at one time found near Sydney, being driven away from its former haunts, for with the exception of a single specimen in the Australian Museum collection procured by Mr. George Masters at Rope's Creek, in July, 1869, I know of no other being obtained in the County of Cumberland since the early days of settlement. It is more abundantly distributed in the open forest lands of the inland portions of Eastern and South-eastern Australia, than

near the coast, although it occurs in the rich coastal brushes of Northern New South Wales and Eastern Queensland. In a southerly direction its range extends into Northern Victoria and the adjacent portion of South Australia, but it is rare in the latter State.

Although widely distributed over New South Wales, it is not found in the extreme western arid portion, and its presence is a certain indication of permanent water being near at hand. Gould refers to the graceful actions of this species, when clinging to the sprays of flowering *Eucalypti*, in search of food. I have seen it in many parts of the State, but nowhere, more common than in the trees bordering the banks of the Mehi and Gwydir Rivers in North-western New South Wales. In these localities Mr. J. A. Thorpe and myself were successful in obtaining a fine

series of these birds in November, 1897, including fledgelings, immature, and fully adult birds of both sexes. In the same month of the following year it was met with again in numbers in the Upper Clarence District. At Wellington and Dubbo in company with Dr. E. P. Ramsay in August, 1887, I obtained several of these birds while feeding on the grassy sward beneath low and wide-spreading *Eucalypti*.

In habits it is bold and pugnacious, and like *Meliphaga phrygia* and *Trofidorhynchus corniculatus*, it is often engaged in the pursuit of, or quarrelling with other species. Its food consists of the nectar and pollen of flowers, chiefly obtained from the different species of flowering *Eucalypti*, also insects and wild fruits and berries. It attacks cultivated fruits with avidity, especially peaches, plums and apricots. The great partiality it evinces for the fruit of the banana among others, in the northern coastal districts of New South Wales, has gained for it in many parts the local name of "Banana-bird."

Mr. Herbert E. Ross writes me as follows:—"Of all native birds the Blue-faced Honey-eater is the most daring when on pillage bent. Once I was lunching with a friend in a wild and unsettled part of the Upper Clarence District, a locality where these birds were probably free from discouraging experiences of unsympathetic orchardists. Attracted by the canned preserves, one of these Honey-eaters fluttered here and there close at hand, and at last settled to taste the sweets of our meal; my friend objected and drove him off. He returned, and I then offered the visitor moist sugar in a spoon at arm's length, which on small consideration he accepted and again settled on our board. I actually grabbed him, and brought him, complacent to the end, a prisoner to Sydney, liberating him in a friend's aviary, where he dominated the other larger birds with an assurance that was amusing in the extreme."

Mr. Edwin Ashby writes me:—"I received a specimen of *Entomyza cyanotis*, from my cousin Mr. George Coleman. This bird was shot by him at Morgan on the Murray River, South Australia, on the 24th March, 1905. He informs me that he first noticed these birds getting honey out of some kerosene tins that had been placed wrong way up on posts to drain. The birds were quite tame and went right up into the tins to procure the honey."

Usually this species re-lines with strips of bark the deserted tenement of *Pomatostonus temporalis*, or forms its nest in a depression at the top of the stick and twig built nest of this species. Both in the Dubbo and the Moree District I found these sites resorted to, but at Copmanhurst, Mr. G. Savidge, who has found them in a variety of situations and formed of different materials, showed me one built at the extremity of a branch of a lofty *Eucalyptus*, cup-shaped in form and made externally of strips of bark, resembling that of *Trofidorhynchus corniculatus*, and fully sixty feet from the ground. The nest here figured was also built by the birds themselves, and was taken by Mr. Savidge near his house, in a gum sapling, in August, 1899. It is formed on an oblong platform of sticks and twigs eighteen inches in length, nine inches in width by six inches in depth, and is cup-shaped in form in the centre, made of strips of bark, the inside being lined with finer strips and shreds of bark, dried grass stems and horse-hair, averaging externally six inches in diameter by three inches and three-quarters in depth, and is compactly built, strips of bark being intermingled throughout the centre of the foundation. This nest which contained two fresh eggs, Mr. Savidge forwarded to the Trustees, and is now in the Group Collection of the Australian Museum.

Another nest received from Mr. Savidge, and taken at the latter end of September 1899, is irregularly formed externally of strips of bark and bark-fibre, with a slight addition of spiders' webs, cocoons, and dried grasses; the inside which is neatly cup-shaped, being lined with plant down and a few pieces of cow-hide with the hair attached. It measures externally five inches in diameter by four inches and a half in depth, the inner cup measuring three inches and a half in diameter by two inches and a half in depth. With it Mr. Savidge sent the following note:—

"This nest of the Blue-faced Honey-eater is quite different from the other one I sent you. It was built by the birds themselves, between a piece of loose bark and the trunk of a ring-barked tree near my house, about fourteen feet from the ground and contained two fresh eggs. This species also frequently constructs its nest in the tops of Grass-trees (*Xanthorrhoea*); I have found several in this position in the scrubs up the river. About Copmanhurst, however, it more often builds in a deserted nest of the Chatterer (*Pomatostomus temporalis*). I have seen these birds building in June and have taken their eggs from July to November."

The eggs are usually two, rarely three in number for a sitting, oval or elongate-oval in form, the shell being closed grained, smooth and slightly lustrous. They vary in ground colour from a rich salmon to a pale fleshy-buff, and typically are sparingly but distinctly spotted and blotched with purplish-red or chestnut-brown, intermingled with a few underlying markings of a fainter hue; the latter in some specimens are bluish-grey. Others may have one or more irregular-shaped markings of yellowish or light rusty-brown. In one set now before me the spots form a zone on the larger end. In some the markings are penumbral, but as a rule, especially those of



NEST AND EGGS OF THE BLUE-FACED HONEY-EATER.

a light ground colour, they stand out in bold relief. A set of two taken at Dubbo, in August 1887, measures:—Length (A) 1.25 × 0.92 inches; (B) 1.27 × 0.92 inches. A very handsome set taken by Mr. Savidge, in the above figured nest is of a warm reddish-buff ground colour which is distinctly spotted and blotched with purplish-red and a few spots of yellowish-brown, intermingled with underlying spots of dark bluish-grey:—Length (A) 1.22 × 0.86 inches; (B) 1.29 × 0.9 inches.

Fledgelings resemble the adult but the feathers are downy and duller in colour, those on the crown of the head and hind neck being dark brown, and those on the throat dull grey. Wing 4.3 inches. This stage of plumage is retained by immature birds, when nearly of the same average measurements as the adult. Wing 6 inches.

June to December constitutes the normal breeding season of this species, during which time two broods are reared. In some seasons eggs may be found in the middle of January, it is however, as a rule an early breeder, and their eggs are more common in August and September than in the later months of the year.

In "The Ibis," Messrs. H. C. Robinson and W. S. Laverock describe a subspecies under the name of *Entomyza cyanotis harterti*, from specimens obtained by Mr. E. Olive near Cooktown, North-eastern Queensland. The principal characters pointed out are its very much smaller size and paler buff basal portion of the inner webs of the primaries. The characters of *Entomyza harterti* are fairly well exhibited in a skin in the Australian Museum collection, presented by Mr. E. A. C. Olive of Cooktown. It may be distinguished from either *Entomyza cyanotis* or *E. albipennis* by the decided yellowish hue of the upper parts and tail, and the sulphur-yellow margins of the basal portions of the outer webs of the primaries. The inner webs of the basal portion of most of the primaries are pale buffy-white, reaching to the shaft; in this respect it more closely approaches *E. albipennis* than it does *E. cyanotis*. Wing 5.6 inches.

Two sets of eggs taken by Mr. R. Hislop, Junr., at Marlon, near Cooktown, on the 21st and the 22nd October, 1899, were sent as the eggs of *Entomyza albipennis*. The former set is very much lighter in the ground colour than typical eggs of *E. cyanotis* taken in New South Wales, being of a pale flesh colour, but similarly spotted and blotched with purplish-red, chestnut-brown and underlying markings of violet-grey:—Length (A) 1.2 × 0.87 inches; (B) 1.2 × 0.85 inches. The other set is precisely similar in colour to typical eggs of *E. cyanotis* taken in New South Wales, and about the same average measurements:—Length (A) 1.3 × 0.87 inches; (B) 1.29 × 0.85 inches. A set of two taken by Mr. Olive, near Cooktown, measures:—Length (A) 1.22 × 0.82 inches; (B) 1.25 × 0.83 inches.

Mr. Bertie Hislop sent me the following note from Cooktown with the eggs of this Honey-eater:—"With the exception of one set of *Entomyza's* eggs taken from a nest of the Silvery-crowned Friar-bird, all I have found were taken from nests built inside old nests of *Pomatostomus*. On two occasions I have taken four eggs of *Entomyza* from one nest, but as they differed so much in shape and markings, I think two females must have laid in the same nest. Mr. E. Olive informs me that he has frequently found the eggs of *Entomyza* in old nests of the Silvery-crowned Friar-bird, and that he has taken them from nests constructed by the birds themselves in the tops of Cocoa-nut and Pandanus palms."

Entomyza albipennis.

WHITE-QUILLED HONEY-EATER

Entomyza albipennis, Gould, Proc. Zool. Soc., 1840, p. 169; *id.*, Bds. Austr., fol., Vol. IV., pl. 69 (1848); *id.*, Handbk. Bds. Aust., Vol. I., p. 563 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 269 (1884).

ADULT MALE—*Like the adult male of ENTOMYZA CYANOTIS, Latham, but having the basal half of the inner webs of most of the quills white, their apical portion darker, as are also the lesser and median upper and under wing-coverts; tail feathers dark brown washed with golden-olive, more distinctly on their outer webs, and tipped with white more largely on the outermost feathers; "bill black; legs and feet slaty-grey; bare skin around the eye cobalt, iris light brown"*—(Morton). Total length 10.5 inches, wing 5.8, tail 4.8, bill 1.1, tarsus 1.5.

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Northern Territory of South Australia.

THE White-quilled Honey-eater is an inhabitant of the northern portion of the continent. It may be chiefly distinguished from the preceding species by the conspicuous white inner webs of the basal portion of the quills and their darker tips, and darker upper and under wing-coverts. The latter characters in Gould's figures of this species in his folio edition of the "Birds

* The Ibis, 1900, p. 635.

of Australia," are somewhat exaggerated, especially in the figure of the immature bird, which is represented with the upper wing-coverts almost entirely black, the throats of both birds also being shown as black. The preceding descriptions are taken from specimens collected by Mr. A. Morton, in February 1879, at Port Essington, on behalf of the Trustees of the Australian Museum. There are also examples in the collection obtained from other parts of the Northern Territory of South Australia in 1870.

Gould refers to this species being smaller than *Entomyza cyanotis*, but the wing measurement given in his "Handbook to the Birds of Australia," 6 inches, equals that of average examples of the southern species. Comparing the specimens obtained by Mr. Morton at Port Essington with examples of *E. cyanotis* obtained in Southern Queensland and Northern New South Wales, the wing-measurement is alike, 5·8 inches.

Two eggs of *E. albipennis*, taken at Port Essington, are of a rich fleshy-buff ground colour which is spotted and blotched with purplish-red, reddish-brown and underlying markings of dark bluish-grey:—Length (A) 1·2 × 0·87 inches: (B) 1·22 × 0·9 inches.

Genus MELITHREPTUS, Vieillot.

Melithreptus atricapillus.

LUNULATED HONEY-EATER.

Certhia atricapilla, Lath., Ind. Orn. Suppl. p. xxxvii. (1801).

Certhia lunulata, Shaw, Gen. Zool., Vol. VIII., p. 224, (1817).

Melithreptus lunulatus, Gould, Bds. Austr., fol., Vol. IV., pl. 72 (1848); *id.*, Handbk. Bds., Vol. I., p. 568 (1865); Gadow, Cat. Bds. Brit. Mus. Vol. IX., p. 204 (1884).

Melithreptus atricapillus, North, Ibis, 1906, p. 55.

ADULT MALE—General colour above yellowish-olive; upper wing-coverts and quills dark brown externally margined with yellowish-olive, the lesser and median coverts with a dusky-grey wash, the apical portion of the outermost primaries narrowly edged externally with ashy-white; forehead, crown of the head and upper portion of the hind neck, feathers at the base of the lower mandible, cheeks and ear-coverts black, a lunulate band on the occiput white; all the under surface white; a small patch of feathers at each side of the fore neck black; under tail-coverts white; bill black; legs and feet brownish-flesh colour; bare space above and behind the eye rich orange-scarlet; iris dark brown. Total length in the flesh 5·5 inches, wing 3, tail 2·4, bill 0·5, tarsus 0·7.

ADULT FEMALE—Similar in plumage to the male but slightly smaller. Wing 2·8 inches.

Distribution—New South Wales, Victoria, South Australia.

SHAW'S specific name of "*lunulatus*," in use for the well-known *Melithreptus* of South-eastern Australia, must give way to Latham's older name "*atricapillus*." The *Certhia atricapilla* of Latham's "Index Ornithologicus" is founded on the Black-headed Creeper of his "General Synopsis of Birds," which he states inhabits New South Wales. It is accurately described, except that Latham omits to make any reference to the crescent-shaped white mark on the back of the head. Shaw's description of *Certhia lunulata*, published in 1817 in his "General Zoology,"[†] is applicable to the young of *Melithreptus atricapillus*, "the back, wings, and tail" being described as "cinnamon-brown." Temminck in his "Planche Coloriées"[‡] figures it as *Meliphaga atricapilla*,

* Ind. Orn., p. xxxvii (1801). † Gen. Syn. Bds., Suppl. ii, p. 167.

‡ Gen. Zool. Vol. VIII., p. 224, (1817).

§ Pl. Col., pl. 335, fig. i. (1838).

and refers it to the *Certhia atricapilla* of Latham, while pointing out that the latter makes no reference in his description to the very characteristic white band on the occiput.

The Lunulated or Black-capped Honey-eater is the commonest species of the genus *Meliphreptus* inhabiting New South Wales and Victoria, its range extending into South Australia. In New South Wales it is freely dispersed throughout the sapling scrubs of the coastal districts, heavily timbered mountain ranges and open forest lands inland, and is equally common in the large public parks and gardens of Sydney.

A tame and fearless species it may be often seen clinging in all conceivable positions while it explores the blossoms of the *Eucalypti* or the flowering spikes of Grass-trees in search of nectar and pollen, or insects which constitutes its food.

It utters a peevish kind of note, which may be closely imitated by one with the lips.



LUNULATED HONEY-EATER.

The nest is a small deep cup-shaped structure, outwardly formed of thin strips or shreds of stringy-bark, closely matted together with cobwebs, and lined inside with cow-hair, fur, feathers, wool, or other soft material. I exhibited a beautiful nest of this species at a meeting of the Linnean Society of New South Wales in September, 1897. It was found close to a poultry farm and constructed almost entirely of white fowl's feathers and white cow-hair, woven and held together with fine strips of bark-fibre and a few pieces of string. An average nest measures externally two inches and a quarter in diameter by two inches and a half in depth; the inner cup measuring one inch and three-quarters in diameter by one inch and three-quarters in depth. It is attached at the rim to the drooping leafy twigs or a thin forked horizontal branch of a tree, generally among the terminal twigs, at a height varying from twelve to forty or fifty feet from the ground, but sometimes it is placed within hand's reach.

The eggs are two or three in number for a sitting, oval or elongate oval in form, the shell being close grained, smooth, and slightly lustrous. They vary in ground colour from a rich flesh to a yellowish-buff, which is thickly freckled and spotted, particularly on the larger end with pale purplish or chestnut-red, the markings frequently assuming the form of a zone. In some specimens the markings consist of short streaks and blurred or penumbral spots, or may be confined almost exclusively to a clouded band around the larger end, of a slightly more pronounced reddish hue than the ground colour. A set of three taken at Belmore, on the 17th September, 1898, measures:—Length (A) 0·75 × 0·55 inches; (B) 0·73 × 0·52 inches; (C) 0·74 × 0·52 inches. A set of two taken at Chatswood, on the 6th September, 1901, measures:—Length (A) 0·83 × 0·55 inches; (B) 0·79 × 0·54 inches.

Young birds differ from the adult and are extremely variable in colour. Of three young males now before me, with the wing-measurement varying only from 2·7 to 2·85 inches, all are different. One has the head, hind neck, back, and scapulars brown, with a slight indication of a yellowish crescentic nape band; circumocular region blackish, all the under surface white, the throat and fore neck slightly tinged with yellow. Another has the head brown mottled with black feathers and a whitish nape band; the other procured by Mr. R. Grant, at Lithgow, has the head yellowish-olive like the back, slightly washed with brown, nape band hardly visible; lores, cheeks, and ear-coverts blackish, all the under surface white washed with yellow, more conspicuously on the sides of the throat and fore neck. This is the largest specimen of the three, and yet there is no

indication of black feathers on the crown of the head. There are specimens in the Australian Museum collection with only one or two brown feathers on the crown of the head, otherwise they are in fully adult plumage.

About the outlying suburbs of Sydney, August and the five following months constitute the normal breeding season, although I saw two fledgelings being fed by their parents at Canterbury on the 26th August, 1893. At Five Dock, on the 13th September, 1892, I saw birds engaged in building three partially constructed nests, all were placed among the outer leafy twigs near the tops of Turpentine-trees from fifteen to twenty feet from the ground. On the 24th September, 1898, at Chatswood, in company with Mr. C. G. Johnston, I saw a bird engaged in constructing a nest among the drooping leaves of a Eucalyptus forty feet from the ground, and also saw fledgelings in a Turpentine-tree being fed by their parents. At Enfield I saw young ones being fed by the parents on the 7th January, 1894. At least two broods are reared during the season.

The egg of the Pallid Cuckoo is frequently deposited in the nest of this species.

Melithreptus chloropsis.

WESTERN LUNULATED HONEY-EATER.

Melithreptus chloropsis, Gould, Proc. Zool. Soc., 1847, p. 220; *id.*, Bds. Austr., fol., Vol. IV., pl. 73 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 570 (1865)

ADULT MALE—Like the adult male of MELITHREPTUS ATRICAPILLUS, Latham, but larger, and "having the bare space above the eye of a pale green instead of red," (Gould). Total length 5.9 inches, wing 3.2, tail 2.5 bill 0.58, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male, but slightly smaller.

Distribution—Western Australia.

THE Western Lunulated Honey-eater is closely allied to the preceding species. In the "Catalogue of Birds in the British Museum"* Dr. H. Gadow places *Melithreptus chloropsis* as a synonym of the former, but in the list of specimens enumerated, there appears to be only one examined from Western Australia. In addition to the distinctive characters pointed out by Gould, the comparative longer bill of *M. chloropsis*, will assist in distinguishing it from the Eastern form. This is most marked in some specimens collected by Mr. George Masters, at King George's Sound, in November, 1868, and in an adult male kindly sent me for examination by Mr. Edwin Ashby, and obtained by him at Guildford, near Perth, Western Australia, in August, 1901. Like *Melithreptus brevirostris*, there appears to be a seasonal change in the colour of the bare space above the eye, for Gould remarks:—"naked space above the eye greenish-white, in others a pale wine-yellow."

In his "Handbook to the Birds of Australia,"† Gould states:—"The nest of *Melithreptus chloropsis* is usually suspended from the small branches near the top of the gum trees, where the foliage is thickest, which renders it extremely difficult to detect. A nest found by Gilbert in October was formed of sheep's wool and small twigs; another found by him in November, was attached to a small myrtle-like tree, in a thick gum forest, not more than three feet from the ground; both these nests contained three eggs, nine and a half lines long by six and a half lines broad, of a deep reddish-buff, thickly spotted all over, but particularly at the larger end, with dark reddish-brown, some of the spots being indistinct, while others were very conspicuous."

* Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 204 (1884).

† Gould, Handbk. Bds. Austr., Vol. I., p. 571 (1865).

Melithreptus albigularis.

WHITE-CHINNED HONEY-EATER.

Melithreptus albigularis, Gould, Proc. Zool. Soc., 1847, p. 220; *id.*, Bds. Austr., fol., Vol. IV., pl. 74 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 571 (1865).

Melithreptus albigularis, (*subsp.*) Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 205 (1884)

Melithreptus albigularis, North, Proc. Linn. Soc. N.S.W., Vol. XXX., p. 395 (1905).

ADULT MALE—Differs from the adult male of *MELITHREPTUS ATRICAPILLUS*, Latham, in having the upper parts rich olive-yellow, and the less amount of black on the sides of the head, which extends only so far down as the base of the upper mandible, leaving the lower portion of the cheeks and the chin white, these parts being black in *M. ATRICAPILLUS*; bare skin behind the eye dull greenish-blue. Total length in the flesh 5·5 inches, wing 2·8, tail 2·25, bill 0·5, tarsus 0·68.

ADULT FEMALE—Similar in plumage to the male, but slightly smaller.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, Northern New South Wales, South-eastern New Guinea.

THE present species is one of the most widely distributed members of the genus *Melithreptus*. It is an inhabitant of the coastal districts of North-western Australia, the Northern Territory of South Australia, Northern and Eastern Queensland, Northern New South Wales, and South-eastern New Guinea. There are specimens in the Australian Museum collection, from South-eastern Queensland, procured by Mr. George Masters at Wide Bay in 1867, and Gayndah in 1870; others from farther north obtained at Port Denison, Cardwell, and Cape York; from the Northern Territory of South Australia, specimens obtained at Port Essington and Port Darwin, and an example from Derby North-western Australia. Mr. George Masters has recorded specimens obtained at Cape York, during the Voyage of the "Chevert," and Dr. E. P. Ramsay has noted it from the Gulf of Carpentaria, and from the neighbourhood of Derby, North-western Australia from specimens procured there by Mr. E. J. Cairn, also the Laloki River, South-eastern New Guinea, in a collection of birds made there by the late Mr. A. Goldie. Count Salvadori records it among a collection of birds made by Dr. L. Loria, at Port Darwin, and recently Dr. E. Hartert records examples from the Fitzroy River, North-western Australia, and from different localities in the Northern Territory of South Australia.

Gould's specific name of *albigularis* is not one that will serve to distinguish this species from either *Melithreptus atricapillus*, or *M. chloropsis*, so I have here adopted the vernacular name of White-chinned Honey-eater. Gould also having previously used the name of White-throated Honey-eater for his *Entomophila albigularis*.

Both Dr. H. Gadow and Dr. E. Hartert regard *Melithreptus albigularis* as only subspecifically distinct from *Melithreptus atricapillus*, Latham, (= *M. lunulatus*, Shaw). With a series of skins before me from Derby, North-western Australia to Wide Bay, South-eastern Queensland, I do not share this view, nor can I find any intergradation between the two species.

That it is an entirely distinct species has since been proved by the receipt of three specimens in the flesh from Mr. George Savidge, obtained by him at Copmanhurst, on the Clarence River, in September 1905, the bare space behind the eye being dull greenish-blue, not bright orange-scarlet as in *Melithreptus atricapillus*. This was the first occasion this species had been recorded in New South Wales.*

The wing measurement of an adult male of *M. albigularis*, obtained by Mr. E. J. Cairn, at Derby, North-western Australia, is 2·75 inches; an adult male procured by Mr. George Masters

* Proc. Linn. Soc. N.S. Wales, Vol. XXX., p. 395 (1905).

at Wide Bay, South-eastern Queensland is 2·88 inches. The wing-measurement of adult males received in the flesh, and obtained by Mr. George Savidge at Copmanhurst, in September, 1905, are the same.

Relative to this species in the Bloomfield River District, North-eastern Queensland, Mr. Frank Hislop writes me as follows:—"Melithreptus albigularis is only found in the open forest land, and although the birds are common, their nests are very difficult to discover. They generally build in Blackbutt or Bloodwood-trees, about fifteen or twenty feet from the ground. The nest is made chiefly of tea-tree bark and cobwebs, and it is suspended at the rim to a thin fork at the end of a branch. Two eggs are the most I have ever found in a nest."

A nest of this species in the Australian Museum collection, taken by Mr. George Savidge, on the 22nd September, 1905, at Copmanhurst, is a small cup-shaped structure, externally formed of strips and shreds of bark, plant down, spider's webs and egg-bags, firmly woven together, the inside being slightly lined with fine thin strips of bark. Externally it measures two inches and a quarter in diameter by two inches and a quarter in depth; the inner cup measuring one inch and five-eighths in depth. It is firmly attached at the rim to the thin horizontal leafy twigs of a Eucalypt. Mr. Savidge writes:—"We had some difficulty in getting this nest as it was built out among the twigs at the end of a branch of a lofty gum, where it was impossible to scoop the eggs out, so chopped off the limb. These birds are fairly plentiful in this district, but their nests are somewhat difficult to find, as they are usually built so high up. None of us could see this nest with the naked eye, but I frequently saw the birds fly to one spot, and with a field glass discovered the nest. I have often seen three birds about a nest."

The eggs are two in number for a sitting, oval in form, the shell being close-grained and smooth, some specimens being slightly glossy, others dull and lustreless. They vary in ground colour from a salmon to a reddish-buff, which gradually becomes darker on the thicker end, where they have clouded bands or zones formed of numerous fleecy confluent markings of a darker shade of the ground colour. Typically they are not distinctly spotted like a common variety of the well-known eggs of *Melithreptus atricapillus*, but more closely resemble the richly coloured eggs of *Ptilotis sonora*, although of course they are much smaller. A set of two eggs in Mr. George Savidge's collection, taken by him at Copmanhurst, on the 21st November, 1897, measures:—Length (A) 0·73 × 0·53 inches; (B) 0·73 × 0·53 inches. Another set taken by him on the 25th August, 1901, measures:—Length (A) 0·78 × 0·53 inches; (B) 0·78 × 0·52 inches. A set of two taken by Mr. J. A. Boyd, at Ripple Creek, Herbert River, Queensland, on the 18th October, 1896, measures:—Length (A) 0·71 × 0·56 inches; (B) 0·73 × 0·58 inches.

Young birds resemble the adults, but are much duller in colour, forehead and crown of the head brown, hind neck, back and rump fulvous-brown, slightly washed with bright greenish-olive on the back; lores, feathers around the eye and the ear-coverts dark brown; patch of feathers at the sides of the fore neck dark brown. Wing 2·6 inches.

In the Clarence River District, New South Wales, Mr. Savidge informs me that the breeding season lasts from August until the end of January, and that he has taken eggs in both these months.

Melithreptus validirostris.

STRONG BILLED-HONEY-EATER.

Haematops validirostris, Gould, Proc. Zool. Soc., 1836, p. 144.

Melithreptus validirostris, Gould, Bds. Austr., fol., Vol. IV., pl. 70 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 565 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 206 (1884).

ADULT MALE—*General colour above dull grey, some of the feathers of the upper back tipped with yellowish-olive; lower back and rump yellowish-olive, becoming slightly brighter on the upper tail.*

coverts; wings like the upper back, but with only a slight tinge of yellowish-olive, inner webs of quills dark brown, outer primaries narrowly edged externally with ashy-white; tail feathers brown, washed with yellowish-olive, except the two outermost feathers on either side; forehead, crown and sides of head and upper portion of hind neck black; a broad band extending from the bare skin behind the eye around the occiput pure white, the hinder portion distinctly washed with dull grey; chin and central portion of upper throat black; cheeks white; lower throat and fore neck greyish-white, gradually passing into a pale greyish-brown on the breast, and brown tinged with faint creamy-buff on the abdomen, centre of the abdomen paler; under tail-coverts pale brown with whitish margins; bill black; legs and feet fleshy-brown, soles of feet ochreous; bare skin behind the eye pale greenish-blue; iris reddish-brown. Total length in the flesh 6.2 inches, wing 3.3, tail 2.7, tarsus 0.73.

ADULT FEMALE—Similar in plumage to the male, but slightly smaller. Wing 3.1 inches.

Distribution—Tasmania; King Island, Bass Strait.

THE Strong-billed Honey-eater is one of the largest species of the genus *Melithreptus*, its wing-measurement being equalled by *M. lactior* and slightly exceeded by *M. gularis*, of the Australian continent. It is an inhabitant of Tasmania, and was also found on King Island by members of the Field Naturalists' Club of Victoria, in November 1887. There are specimens in the Australian Museum collection obtained by Mr. George Masters at Brown's River, Tasmania in May, 1867, by Mr. K. Broadbent, at Georgetown near Launceston, and it has been received in the flesh from Mr. E. D. Atkinson of Waratah, Mount Bischoff. In December, 1906, I obtained adults and full fledged young at the Cascades near Hobart. They were frequenting low Acacias on the creek banks, and not the tall Eucalypts, like *Melithreptus melanocephalus*, found in the same locality. It appears to be a tame and sociable species. Sitting quietly under a low tree I observed five of these birds in a row on a branch, two adults and three young ones, and two on a branch lower down, picking and cleaning each others feathers.

In his description of this species, Gould states the occipital band is white, while Dr. H. Gadow in the "Catalogue of Birds in the British Museum,"* describes it as pure white. In all the adult specimens I have examined, the posterior and greater portion of the white occipital band is conspicuously washed with dull grey.

Dr. Lonsdale Holden writes me:—"I have met with *Melithreptus validirostris* in the coastal districts of both Northern and Southern Tasmania, but most likely it occurs throughout the island where there is light timber. It haunts thickets on hill sides or in gullies, and is never met alone, and has the restless noisy disposition common to most Honey-eaters. Although a cheerful bold bird, often exploring the bark of a tree stem when close to you, I have never seen it in a garden. The nest is a deep cup in form, and in my experience is chiefly constructed of tea-tree bark. Those I have seen were in box-trees fifteen or twenty feet from the ground. I have known of a nest on the 1st of November with two eggs, and another with half fledged young on the 3rd January. I have also seen this Honey-eater feeding full-grown young ones on the 9th November. The parents vigorously defend their young, and I have known other adult birds of the same species to assist in the defence. Young birds differ from the adults in having the band on the sides of the head and around the nape yellowish."

Mr. Malcolm Harrison writes me:—"Notwithstanding the wide distribution over Tasmania of *Melithreptus validirostris*, and the numbers which may be seen in particular localities, the nests are by no means easily found; they are cup-shaped structures, mostly formed of bark and wool, and are attached by the rim. Eucalypt saplings and young trees of *Pomaderris apetala* are favourite nesting sites, but I have noticed many nests in the Native Cherry (*Exocarpus*), and when this is the case they are placed much nearer the ground, probably on account of the cover being denser than it would be in a sapling at the same height. Three eggs are laid for a sitting.

* Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 206 (1884).

Two sets in my collection were taken on the 13th October and the 11th November respectively which is comparatively late, the bird being as a rule an early nester. That of the 13th October, containing three eggs, taken by myself at Berriedale, was placed among the dead leaves of the drooping head of a tall Eucalypt sapling that had fallen partly across a fence and some tree trunks, the topmost branches remaining twenty feet or more from the ground. The nest was discovered by seeing the bird fly to the spot with building material. After due time had been allowed for the completion of nesting operations and laying of eggs, another sapling was cut and erected immediately under the nest with the aid of ropes like a bell-tent pole, and three fresh eggs obtained."

A nest received from Mr. E. D. Atkinson, is a compact and rather bulky cup-shaped structure in comparison with the neat nests of the continental species *M. gularis*, *M. atricapillus*, and *M. brevirostris*, and one unless resembling its environment would be very easy to detect. It is outwardly composed of long strips of bark and bark fibre, which is thinly coated with a sage-green lichen, the inside being lined with fine shreds of bark, and at the bottom with the silky-brown downy covering of the young fronds of a tree-fern. Externally it measures four inches in diameter by three inches and a half in depth, the inner cup measuring two inches and a half in diameter by one inch and a half in depth. This nest, found by Mr. G. F. Hinsby, was built about ten feet from the ground in the thin hanging twigs of a "Native Willow" growing on a creek bank, four miles from St. Helens, Tasmania, and contained three slightly incubated eggs. Mr. Atkinson sends me a note that his brother the Rev. H. D. Atkinson, of Evandale, has found nests of this species in the scrub at Circular Head, also in "Native Box" trees. One found on the 2nd November, 1887, contained two fresh eggs, and another on the 4th December, three hard set eggs.

The eggs are three in number for a sitting, of a somewhat lengthened oval in form, the shell being close-grained, smooth and lustreless. In ground colour they vary from a fleshy-white to a fleshy-buff, which is dotted and spotted, particularly on the larger end, with different shades of purplish-red or purplish-brown and fainter underlying markings. On some specimens the markings are in the form of small faint purple blotches with one or more overlying spots of a distinctly darker shade. The eggs of this species lack the rich ground colour of typical eggs of *Melithreptus gularis* and *M. brevirostris*, and approach more closely the eggs of some species of the genus *Ptilotis*, more particularly those of *P. penicillata*. A set of three from the above described nest, measures:—Length (A) 0.89 × 0.63 inches; (B) 0.85 × 0.63 inches; (C) 0.89 × 0.64 inches.

From the above quoted notes it will be seen that the breeding season commences in July and continues until the middle of January.

Melithreptus melanocephalus.

BLACK-HEADED HONEY-EATER

Meliphaga atricapilla (non *Certhia atricapilla*, Lath.), Jard. and Selby, pl. 134, fig. I. (1835).

Eidopneus affinis, Less., Rev. et Mag. de Zool., 1839, p. 167?

Melithreptus melanocephalus, Gould, Proc. Zool. Soc., 1845 p. 62; *id.*, Bds. Austr., fol. Vol. IV., pl. 75 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 573 (1865); Galow, Cat. Bds. Brit. Mus., Vol. IX., p. 207 (1884).

ADULT MALE.—General colour above olive-yellow, duller on the hind neck and mantle, brighter on the upper tail-coverts; wings greyish-brown, quills externally edged with greyish-white; shoulders blackish; tail feathers greyish-brown narrowly edged with greyish white, and having dark brown shafts; entire head, throat, fore neck, and breast black; a line of feathers on the sides of the neck and

chest black, where on the latter it terminates in a patch; remainder of the under surface white, the sides of the breast and the abdomen washed with grey; under tail-coverts white with pale grey centres; bill black; legs and feet dark fleshy-brown; bare skin above the eye very pale greenish-white; iris blackish-brown. Total length in the flesh 5·3 inches, wing 3·15, tail 2·5, bill 0·4, tarsus 0·68.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Tasmania: King Island, Bass Strait.

AS previously pointed out by me in "The Ibis,"* Jardine and Selby, in their "Illustrations of Ornithology,"† figure *Melithreptus atricapillus* under Shaw's specific name of *lunulata*, and on the same plate figure, and on the following page describe, the Black-headed Honey-eater of Tasmania under the name of *Meliphaga atricapilla*. The latter name, however, is preoccupied by Latham for the continental species. Jardine and Selby state:—"The two birds which we have now figured appear to be involved in some obscurity with regard to each other. . . . They both inhabit New Holland, Van Diemen's Land, and the islands of the Southern Ocean." Lesson's description of *Eidopsarus affinis*, published in the "Revue Zoologique,"‡ in 1839 "capite, genis, gulâque nigerrimis,"—apparently also applies to the Tasmanian species, but the habitat is given as "Nova Wallia meridionalis." In the "Catalogue of Birds in the British Museum,"§ Dr. Gadow refers to this description as "*Meliphaga*" *affinis*, and places this name as a synonym of Gould's later description, published in the "Proceedings of the Zoological Society," 1845 p. 62, under the name of *Melithreptus melanocephalus*. If it is really synonymous with the latter species, Lesson's specific name "*affinis*" should take precedence. It is to be regretted, however, that Jardine and Selby did not give a distinctive appellation of their own, instead of using a pre-occupied name of Latham's, for theirs is the first accurate description and figure of the Black-headed Honey-eater of Tasmania, having been published in their "Illustrations of Ornithology" in 1835. The habitats of the two species figured and described by them are partly incorrect, for the Lunulated Honey-eater is confined to Australia, and the Black-headed Honey-eater to Tasmania and some of the larger islands of Bass Strait. But the assignment of wrong habitats was of common occurrence at that time when so little was known of the Antipodes.

The present species is widely distributed over Tasmania, it has also been met with on King Island by members of the Field Naturalists' Club of Victoria, in November, 1887. During December, 1906, I noted adults accompanied by their young feeding in the Eucalypts, also on the ground bordering the creek sides at the Cascades near Hobart, where I procured specimens.

Dr. Lonsdale Holden sends me the following notes:—"Melithreptus melanocephalus builds among the leaves of the terminal branchlets on the top of a gum tree, and makes its nest of moss so that from the ground it is most difficult to distinguish it from an unusually dense cluster of green leaves. The best way to find this bird's nest is to go into the bush soon after dawn and seek for a builder at work. It is generally equally difficult to reach the nest at the end of a slender branch without breaking the eggs. This Honey-eater usually breeds in October and the two following months. I have taken three fresh eggs on the 26th December. The difficulty of finding this bird's nest is increased by the fact that the leaves, among which it builds, are often sewn or cemented together by some insect for the purpose of producing little greenish-white caterpillars; not only do these collections of attached leaves fifty feet up in the air exactly resemble little green nests, but the Black-cap Honey-eater itself is very fond of exploring these leaf bunches in search of food. I have more than once made the mistake of supposing a bird was building its nest while it was busy with such a bunch. Even from a distance of six feet it is very difficult to distinguish the Black-cap's nest. The green leaves of the tree are attached to

* The Ibis, 1906, p. 56.

† Illus. Ornith., Vol. III., pl. 134 (1835).

‡ Rev. Zool., 1839, p. 167.

§ Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 207 (1884).

the sides of the nest and hide it, and there is the green moss of the nest itself to make it still more invisible. I found one nest made mainly of wool and fastened to the stems of gum leaves by its rim. Having cut down the branch to examine the nest and finding young there, I tied the branch as nearly in its former position as I could; whereupon the parent birds at once resumed their duties. This nest was externally three inches and a half long from rim to bottom, diameter over all about three inches, depth inside two inches and a quarter. It was formed of wool and green moss firmly felted together, with a very little hair in the lining, and traces of cobwebs and lichen on its exterior. Another nest had no wool in it, only moss, cobwebs, and dry vegetable fibre, and had a bottom lining of flower seeds, the base of it was very dense and compact, the walls less solid. A nest about one quarter built on December 7th, had three fresh eggs in it on December 25th. I have not met with this bird in myrtle or heavy eucalyptus forests, always in lightly timbered country."

Mr. Malcolm Harrison writes me:—" *Melithreptus melanocephalus* is widely distributed over Tasmania, and the spurs of Mount Wellington and Mount Faulkner covered with Eucalypt saplings, are favourite nesting haunts. The nest composed of bark, spiders' web, wool and moss, is suspended among the hanging leaves of saplings or trees, generally at a considerable height from the ground. From its small size and general resemblance to its surroundings, it is exceedingly difficult to discover unless from following the actions of the birds when forming the nest or feeding the sitting bird. Nesting operations are carried on during the three last months of the year. The eggs are three in number for a sitting and those in my collection were mostly taken by Mr. A. E. Brent, who is very successful in locating the nest of this species. They were found between Glenorchy and Bridgewater. The Black-headed Honey-eater appears to be one of the most favoured foster parents of the Pallid Cuckoo."

A nest and two eggs in the Australian Museum collection presented by Mr. Malcolm Harrison, were taken by Mr. Darcy Denne on North Bruny Island, on the 14th November, 1897. The nest is formed of bark fibre, mosses, spiders' webs and cocoons, all matted up together, the inside being sparingly lined at the bottom with feathers. It measures externally three inches in diameter by two inches and three-quarters in depth; the inner cup measuring two inches in diameter by two inches in depth. It contained three fresh eggs, one of which was broken in taking the nest. The eggs are oval in form, the shell being close-grained, smooth, and lustreless. They are of a light reddish-buff ground colour, over which are sprinkled dots, spots, short streaks and small irregular-shaped blotches of chestnut-red intermingled with a few underlying spots of faint purplish-grey and red, the markings, some of which are penumbral being larger and more unevenly disposed on the thicker end. Length (A) 0.77 × 0.58 inches; (B) 0.77 × 0.56 inches.

From Mr. E. D. Atkinson I received a set of three eggs, taken on the 26th September, 1888, by Mr. G. K. Hinsby from a nest in a tree on the hill side on the Brown's River road, about six miles from Hobart. Mr. Hinsby states that:—"the nest was outwardly built of fine strips and shreds of bark, moss, cobwebs, and cowhair. Externally it measured two and three-quarters in diameter by three inches in depth, internal diameter two inches. The nest was built among the topmost leaves of a *Eucalyptus viminalis*. Both birds were seen, and the eggs were slightly incubated." Another nest Mr. Atkinson informs me was found by his brother the Rev. H. D. Atkinson, at Evandale, on the 28th November, 1889. It was built in the topmost branches of a Peppermint gum and contained three young birds.

The eggs from the above nest are oval in form, the shell being close-grained, smooth and lustreless. They are of a very pale salmon-buff ground colour with zones around the larger ends formed of dots, spots and short linear streaks of light chestnut-red, the markings on one specimen being paler and of only a slightly darker hue than the ground colour. Length (A) 0.82 × 0.58 inches; (B) 0.82 × 0.50 inches.

Young birds resemble the adults, but have the forehead, crown of the head and hind neck brown tinged with greenish-olive; lores, cheeks and ear-coverts blackish, all the under surface dull white, the throat and fore neck washed with pale yellow, being slightly richer on the sides of the throat, some of the feathers on the centre of the throat and at the sides of the chest blackish. Wing 2·8 inches. The same variation is seen in the young of *M. melanocephalus*, as in the continental species *M. atricapillus*. An immature male of the former in the Australian Museum collection is similar to the young bird described above, but has the forehead and a broad stripe extending on to the crown of the head black. Wing 3 inches.

From the preceding notes it will be seen that the usual breeding season of this species commences in September and continues until the middle of January.

Melithreptus brevirostris.

SHORT-BILLED HONEY-EATER.

Melithreptus brevirostris, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 315 (1826); Gould, Handbk. Bds. Austr., Vol. I., p. 569 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 207 (1884); North, Rec. Austr. Mus., Vol. V., p. 337 (1904).

ADULT MALE—*General colour above greenish-olive, duller on the hind neck and upper back, brighter on the rump and upper tail-coverts; upper wing-coverts brown with greyish-brown margins; quills brown externally margined with greyish-white; tail feathers brown margined externally with olive, except on the outermost feather on either side; forehead dark brown, crown of the head and nape dark brown with dull greyish-brown margins to all the feathers, the darker centres decreasing in size towards the nape where they are almost obsolete; feathers above the anterior portion of eye and the ear-coverts dark brown, the latter separated from the sides of the nape by a line of dull whitish feathers, which is continued in a dull brownish-white band around the occiput; cheeks whitish passing into a brownish-white on the centre of the chin, throat and the remainder of the under surface, the centre of the breast and abdomen faint creamy-brown; under tail-coverts pale brown with dull whitish margins; bill black; legs and feet reddish-brown, the sides and soles of the feet ochreous-yellow; iris hazel; bare space above and behind the eye greenish-blue in winter, dull yellow in summer. Total length in the flesh 5·7 inches, wing 2·8, tail 2·35, bill 0·45, tarsus 0·68.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Western Australia.

THE type of *Melithreptus brevirostris* was described by Vigors and Horsfield in the "Transactions of the Linnean Society of London" from specimens obtained by Mr. Caley in the neighbourhood of Sydney, probably Parramatta, where he lived. It is widely distributed, from Queensland south to Victoria, and thence west to Western Australia, and is subject to considerable variation in size and depth of colour, especially of the under parts. There are examples in the Australian Museum collection procured by Mr. George Masters on the Blue Mountains in 1864; others obtained by Dr. Ramsay, at Cardington, on the 1st February, 1866, and numerous specimens obtained by the Curator, (Mr. R. Etheridge), the Taxidermist (Mr. J. A. Thorpe) and myself at Sutherland, Toongabbie and Roseville, New South Wales; a specimen obtained on the 20th July, 1863, at Port Denison, Queensland, and another procured at the Flinders Range, South Australia. The Trustees of the South Australian Museum, Adelaide, and Mr. Edwin Ashby have kindly lent specimens from different parts of South Australia.

Specimens obtained in the neighbourhood of Sydney are slightly larger and darker on the under parts than are others obtained on the Blue Mountains, which is contrary to the general

* Trans. Linn. Soc. Lond., Vol. XV., p. 315 (1826).

rule as regards size. Wing-measurement of adult males obtained in the neighbourhood of Sydney, vary from 2·8 to 3 inches. The Port Denison, Queensland, specimen is similar to Sydney examples, but slightly under the average size, wing 2·75 inches. Of the specimens in the South Australian Museum, one from Blackwood is similar in colour and size to examples obtained at Toongabbie and Roseville, New South Wales, but it has a dull buffy-white loreal streak which is only occasionally found in New South Wales birds. A specimen obtained by Dr. A. M. Morgan at Laura, about one hundred and forty miles north of Adelaide, is slightly smaller, has the buffy-white loreal streak more pronounced, the cheeks a clearer white, and the under parts of a more faint creamy-buff shade. Wing 2·7 inches. Another, an adult female obtained seventy miles west of Port Victor is similar in colour and size to an adult male in the Australian Museum collection, received from the Perth Museum, under the name of *Melithreptus leucogenys*. Wing 2·65 inches. It is slightly smaller, has only a very small and indistinct loreal streak, paler under parts, and the blackish-brown band below the nape very pronounced. I shot a similar bird at Dubbo two hundred and seventy-eight miles west of Sydney. Specimens in Mr. Edwin Ashby's collection obtained respectively at Happy Valley and Saddleworth in January and February, 1900, differ chiefly from the preceding in their slightly larger wing-measurement and their distinct sandy-buff under parts. Wing 2·7 - 2·8 inches. Of these birds Mr. Ashby writes—" *Melithreptus brevirostris* is very numerous in the neighbourhood of Blackwood, South Australia, especially in the scrubby sandy country." From an examination of specimens in the Macleay Museum, I believe Western Australian examples, in addition to having lighter under parts are not only occasionally, but constantly smaller than typical examples obtained near Sydney, but similar birds are sometimes found in South Australia, and the inland portions of New South Wales.

I first met with this species in the sapling scrubs around Bendigo, Victoria, and also in the larger Eucalypti on the shores of Western Port Bay. At West Narrabri, New South Wales, in November, 1896, only two pairs were seen. In the neighbourhood of Sydney it is fairly common in some localities, especially in the winter months, when it moves about in small flocks from about seven to twelve or more in number; one's attention being more often attracted to it by its peculiar grating or rasping notes as it passes from tree to tree. It frequents scrub and open forest lands, and is particularly plentiful at Middle Harbour, where I have seen it feeding in June, on the long flowering stalks of the Grass-tree in company, at various times, with *Melithreptus atricapillus*, *Glycyphila fulvifrons*, *Ptilotis fusca*, and *P. chrysops*. At this time of the year, and in this locality, it appears restless in habits, except when feeding, a flock alighting on a tree and then flying away a few seconds later to another at a remote distance.

During many years' observation in the field, I have noted a seasonal change in the colour of the bare space above and behind the eye. Adult specimens of both sexes shot in different localities, in July and August, all had the bare space above and behind the eye dull greenish-blue. Others, adult specimens, procured from January to April, had these parts dull yellow.

Stomachs of these birds examined contained only the remains of insects, principally of small black beetles, but this species also feeds on the nectar of flowers.

A nest taken by Mr. A. E. Ivatt, at Glanmire, near Bathurst, New South Wales, is a very neat cup-shaped structure attached by the rim to a thin forked branch of a Eucalyptus, and is formed of thin strips of bark, with which is freely intermingled white cow-hair; it is lined throughout entirely with the latter material. Externally it measures two inches and a quarter in diameter, by two inches and a quarter in depth; the diameter and depth of the inner cup also measuring alike, two inches. Farther inland, at Cardington on the Bell River, Mr. John Ramsay obtained birds, and nests with one and three eggs, in November, 1867. Nearly twenty years later, in August, 1887, in company with Dr. E. P. Ramsay, we procured birds on the same river.

A nest taken by Dr. A. Chenery is a very compactly formed, cup-shaped structure, the walls and rim of the nest being unusually thick, and the latter rounded; it is formed of fine shreds of bark, dried grasses, cobweb and hair, all firmly woven together, the bottom of the nest inside being thickly lined with rabbit fur. Externally it measures three inches in diameter by two inches and a quarter in depth, the inner cup two inches in diameter by one inch and a half in



NEST OF THE SHORT-BILLED HONEY-EATER.

depth; width of rim half an inch. It contained three eggs, which were forwarded for examination, also a skin of the parent bird. Writing me in July 1901, Dr. Chenery remarks:—"The nest of *Meliphreptus brevirostris* was taken on the 24th September, 1900, in a Black Wattle tree, at a height of ten feet from the ground, in the Flinders Range near Port Augusta, South Australia. It is the only nest I found and that after carefully watching the flight of the birds while building. They collected their materials at a considerable distance from the tree containing the nest."

Although this species is fairly common in the neighbourhood of Sydney, its nest is not often found. A pair built in a Eucalyptus close to my house at Roseville towards the end of November 1903, but only succeeded in rearing a fledgeling Pallid Cuckoo. The latter with the female foster-parent were procured on the 7th January, 1904, and are now mounted in the Australian Museum. The nest figured, was found in the adjoining suburb of Chatswood, on the 12th August, 1906, by Mr. R. Meikle, his attention being drawn to it by the cries of young birds while being fed by the parents. Three days later we found the young birds had left the nest but were in a sapling near at hand, having their wants attended to

by one of the parents, probably the female. They were secured, and together with the nest are now in the Group Collection of the Australian Museum. The nest, which is attached by the rim to two thin horizontal leafy twigs, is a neat, deep, cup-shaped structure, externally formed of thin strips of stringy bark, spiders' webs and portion of their white egg-bags, and cow-hair, all woven together, the latter material being plainly visible in the accompanying figure; inside it is lined at the bottom with cow-hair into which are worked two white feathers. Externally it measures two inches and a quarter in diameter by three inches in depth, the inner cup measuring one inch and three-quarters in diameter by two inches in depth. It was built in an Ironbark sapling twenty-five feet from the ground, among the thin upright leafy twigs within fifteen inches of the top of the tree. Later on in the season, two more nests containing young birds were found at Chatswood and Roseville.

The eggs are usually three, sometimes only two, in number for a sitting, oval in form, the shell being close-grained, smooth, and lustreless. A set of three taken on the 24th December, 1900, by Dr. Chenery, are of a fleshy-buff ground colour, which is dotted and spotted with reddish chestnut, one specimen being almost uniformly marked over its surface, another has a well-defined zone on the thicker end, the spots being larger on one side than the other; the third specimen has the markings scattered over the larger end, where in one place they assume the form of large penumbral blotches. Length (A) $0\cdot7 \times 0\cdot54$ inches; (B) $0\cdot69 \times 0\cdot55$ inches; (C) $0\cdot7 \times 0\cdot54$ inches. A set of three in the collection of Mr. Chas. French, Junr., vary in ground colour from fleshy-white to fleshy-buff, being of a darker shade on the larger end, where they are minutely freckled and boldly spotted with rich purplish-red, intermingled with a few underlying spots of dull purplish-grey on the larger end:—Length (A) $0\cdot78 \times 0\cdot58$ inches; (B) $0\cdot78 \times 0\cdot55$ inches; (C) $0\cdot75 \times 0\cdot51$ inches. A set of two in the Australian Museum collection taken by Mr. E. Angove on the 1st September, 1906, at Pellerin Scrub, on the Murray River, South Australia, measures:—Length (A) $0\cdot7 \times 0\cdot56$ inches; (B) $0\cdot72 \times 0\cdot53$ inches. This set also contains an egg of the Pallid Cuckoo.

The usual breeding season of the Short-billed Honey-eater in south-eastern Australia commences at the latter end of August or early in September, and continues over the four following months. The nest, however, here figured, must have been commenced early in July, but the autumn and early winter months of 1906 were very dry, and several species of Honey-eaters bred unusually early that year in the neighbourhood of Sydney.

A closely allied form of this species, *Melithreptus magnirostris** is found on Kangaroo Island, South Australia.

Melithreptus gularis.

BLACK-THROATED HONEY-EATER.

Hematomys gularis, Gould, Proc. Zool. Soc., 1836, p. 144.

Melithreptus gularis, Gould, Bds. Austr., fol., Vol. IV., pl. 71 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 566 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 205 (1884).

ADULT MALE—*General colour above olive-yellow, becoming a clearer yellow on the rump, the hind neck paler and having a slight ochreous wash; wings brown, the lesser and median upper wing-coverts of a slightly darker shade; the primaries narrowly edged and the secondaries externally margined (the latter less distinctly) with whitish-grey; tail feathers brown margined with whitish-grey; forehead, crown of head, lores, a line of feathers below the eye, the ear-coverts and upper portion of hind neck black, the latter separated by a buffy-white band on the nape which passes into pure white on either side of the nape where it extends to the bare skin behind the eye; cheeks and sides of throat white; chin and centre of upper throat blackish, passing into a dull blackish-grey on the lower throat, and pale greyish-brown on the fore neck and breast; sides of the breast and abdomen creamy-brown; centre of the lower breast and abdomen dull white; under tail coverts dull white; bill black; legs and feet dark yellow; iris hazel; bare skin above and behind the eye deep opal-blue or bluish-green. Total length in the flesh 6·75 inches, wing 3·4, tail 2·7, bill 0·58, tarsus 0·75.*

ADULT FEMALE—*Similar in plumage to the male, but slightly smaller.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Western Australia.

THE Black-throated Honey-eater is widely distributed over the Australian continent, and may be met with in favourable situations on the coast, as well as far inland. Mr. George Masters, collecting on behalf of the Trustees of the Australian Museum, obtained specimens at

* North, Rec. Austr. Mus., Vol. VI., p. 20, pl. v., fig 2 (1905).

Port Lincoln, South Australia, in 1865; at Wide Bay, Queensland, in September, 1867; and at King George's Sound, Western Australia, in 1868. Mr. Kendal Broadbent met with it near Rockhampton, also in the Chinchilla District, about two hundred miles west of Brisbane. From the Trustees of the South Australian Museum I have received adult and young specimens for examination, obtained by Dr. A. Morgan at Laura, about one hundred and forty miles north of Adelaide, and one skin from Mildura, Victoria. Mr. Edwin Ashby, also sent me a specimen he procured at Blackwood, South Australia, and writes as follows:—" *Melithreptus gularis* is one of our commonest birds at Blackwood, and its loud cry is to be heard throughout the year, but more especially in early spring. The male has a very sweet song, quite in contrast to its ordinary loud and almost discordant cry. I always think this species makes more noise in proportion to its size than any other bird. When the *Eucalyptus leucoxylois* is in flower this bird is present in great numbers. There are plenty of young birds to be seen in the season, but the nests are difficult to get."

Dr. W. A. Angove, who forwarded to the Trustees of the Australian Museum a nest and a set of eggs taken at Tea-tree Gully, near Adelaide, writes:—" *Melithreptus gularis* is found throughout the Mount Lofty Range, and on the foothills towards Adelaide. Nearly all the nests we find or hear of are built in Blue-gum trees, though they occasionally nest in Red gums. The drooping ends of the outside branches of fairly grown saplings are the places they choose, and it is always difficult to get to their nests." Writing on the 21st February, 1907, he remarks:—"I have just received a set of fresh eggs of *Melithreptus gularis*, taken in this district."

The preceding descriptions are taken from specimens obtained on the 18th April, 1894, by Mr. J. A. Thorpe and myself at Toongabbie, eighteen miles west of Sydney. There are also examples in the Australian Museum collection procured at Homebush and Eastern Creek, in 1864, by Mr. George Masters; Mr. R. Grant has also shot this bird at Five Dock, on the Parramatta River, and on two occasions I have observed it at Roseville. Individual variation exists in this species. Some specimens show hardly any trace of the lighter edges to the quills. An adult female, shot by Mr. R. Grant, from a flock of three, at Buckingham Station, is of a richer olive-yellow on the upper parts, and the under parts are paler than specimens procured near the coast, and is almost intermediate in colour between *Melithreptus gularis* and *M. lactior*. Somewhat similar in colour on the upper parts is an adult specimen in the South Australian Museum, obtained by Dr. A. M. Morgan, at Laura, South Australia, in 1894, the underparts having a more decided creamy tinge, like specimens in the Australian Museum collection procured at Homebush.

The stomachs of four specimens procured at Toongabbie while feeding among the flowering *Eucalypti* contained the larvæ of insects, and also in one, a few seeds.

In the neighbourhood of Sydney and elsewhere in New South Wales this Honey-eater is nomadic in habits, appearing in limited numbers some seasons and then it may be absent for years. Gould, who described the type from a specimen obtained in New South Wales, remarks that he "observed it to be tolerably numerous on the plains in the neighbourhood of the Namoi River."* I failed to meet with it, however, during two seasons I made excursions to different parts of that river. Mr. E. H. Lane sent me for examination a nest, with two eggs and skin of the parent bird, he procured at Wambangalang Station, nineteen miles from Dubbo, relative to which he writes me:—"The only nest of *Melithreptus gularis* I have taken was one found here by my son when it was building. It was in a box sapling, about fourteen feet from the ground. I left it until the bird had been sitting for several days, so as to be sure of a full set of eggs, which proved to be two. I took this nest on the 5th November, 1892, and shot the bird, which I sent to you with the nest and eggs for identification.

* Gould, Handbk. Bds. Austr., Vol. I., p. 566 (1865).

Although I have made every effort, I have never procured another set, and have only once seen the bird since at Wambangalang, during a period of twelve years. Eggs taken by me in 1881-2, and attributed to this species, I have since ascertained by shooting the birds, were in reality the eggs of *Ptilotis fusca*."

The wing-measurement of adult males varies from 3·3 to 3·5 inches.

The nest taken by Mr. Lane is a deep-shaped structure, attached by the rim to some thin drooping leafy twigs of a Eucalyptus; outwardly it is formed of fine shreds of red stringy-bark, grasses, and wool, closely interwoven and felted together, the inside being thickly lined with opossum fur. It is compact and well made, measuring externally about two inches and three quarters in diameter by nearly three inches in depth, the inner cup measuring two inches in diameter by two inches and a tenth in depth. The nest taken by Mr. E. Angove at Tea-tree Gully, near Adelaide, is of the same average measurements, but is constructed throughout of dried grasses, a small quantity of bark fibre, and white cow-hair, the inside being thickly lined with the latter material. There is also another nest from the same locality in the Group Collection of the Australian Museum, presented by Mr. A. Zietz, the Assistant Director of the South Australian Museum.

The eggs are two in number for a sitting, oval in form, the shell being close-grained, smooth, and lustreless. Those taken by Mr. Lane are of a salmon ground colour, with reddish spots and blotches of different shades, being larger at the thicker end, where a few small and nearly obsolete markings of pale purplish-grey appear. The ground colour of one specimen is very much paler, rendering the markings more distinct; several of them on the darker ground-coloured specimen are penumbral, or look as if laid on another of a lighter hue. Length (A) 0·82 × 0·59 inches; (B) 0·82 × 0·6 inches. Of a set of two in the Australian Museum collection taken by Mr. E. Angove at Tea-tree Gully, near Adelaide, one is of a faint reddish flesh-ground colour, and of a slightly richer shade on the thicker end, where there are dots, spots and blotches of purplish-red and similar underlying markings of purplish-grey, with a few small flecks and dots scattered over the remainder of the shell. The other specimen is of a pale fleshy-white ground colour, with small dots, flecks, short streaks, and irregular linear markings of light purplish-red intermingled with a few underlying dots and spots of dull purplish-grey, the markings as usual predominating on the thicker end. The eggs measure alike:—Length 0·77 × 0·57 inches.

Young birds have the upper parts faint rufous-brown, with dull grey bases to the feathers, which show through here and there; wings brown, the upper wing-coverts and secondaries with dull rufous-brown margins; tail feathers brown, margined with yellowish-olive, more distinctly on the central ones, and passing into dull rufous-brown around the tips; head, ear-coverts, and hind-neck faint rufous-brown, with a white band on the nape, dull rufous in the central portion; lores and tips of ear-coverts blackish; all the under surface and under tail-coverts dull white; chin, centre of throat, and fore neck washed with light rufous-brown. Wing, 3 inches.

The last trace of immaturity in nearly adult birds is usually exhibited on the crown of the head, where a few pale brown feathers are intermingled with the black ones. Wing, 3·3 inches.

Melithreptus laetior.

YELLOW-BACKED HONEY-EATER.

Melithreptus laetior, Gould, Ann. and Mag. Nat. Hist., ser. 4, Vol. XVI., p. 287 (1875); *id.*, Bds. New Guin., Vol. III., pl. 40 (1875–88); North, Vict. Nat., Vol. XVI., p. 12 (1899).

ADULT MALE—*General colour above bright yellow, the back distinctly washed with olive; wings brown, the lesser and median wing-coverts of a slightly darker shade: the quills narrowly edged*

externally with whitish-grey; tail brown, all but the lateral feathers edged externally with olive-yellow, the central pair being edged on both webs; forehead, crown of head, lores, a line of feathers below the eye, the ear-coverts and upper portion of hind neck black; a band of feathers commencing at the bare space behind the eye and extending around the occiput, pure white; cheeks and sides of throat pure white; chin black; remainder of the under surface white, the centre of the upper throat blackish grey passing into an ashy shade on the fore neck and breast; under tail-coverts white; bill black; naked skin above and behind the eye "bright yellow" (Andrews). Total length 6 inches, wing 3.3, tail 2.7 bill 0.58, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-western Australia, Queensland, South Australia.

THE type of this very distinct species was described by Gould from a specimen received from the late Mr. F. G. Waterhouse, a former Director of the South Australian Museum, Adelaide, in 1875,* who wrote Gould as follows:—"Mr. F. W. Andrews, who for many years has been collecting birds in this colony, has just returned from the Lake Eyre Expedition with a good collection of bird-skins. A new species of *Melithreptus* is the finest I have ever seen of the genus; only four were shot, and I send you the best. The collector remarks that when alive they had a bright yellow rim round the eyes." One of the co-types, collected at the same time by the late Mr. F. W. Andrews, was received by Dr. E. P. Ramsay from the late Mr. F. G. Waterhouse, during the same year, and is now in the collection of the Australian Museum. The Yellow-backed, or as Gould calls it, the Beautiful Honey-eater, is widely distributed over the Australian continent. Specimens now before me, collected by the late Captain W. E. Armit at the Gulf of Carpentaria, Queensland, by Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower at Derby, North-western Australia, are indistinguishable in colour from the co-type collected by the late Mr. F. W. Andrews in South Australia. Individual variation exists though in this species in the same way as it does with its near ally, *M. gularis*, and many others, the largest and brightest specimen in the collection being a fine old adult male obtained by Mr. G. A. Keartland close to the camp of the Calvert Exploring Expedition, near the junction of the Fitzroy and Margaret Rivers in North-western Australia. Wing, 3.4 inches. Two specimens have the upper wing-coverts uniform in colour with the quills.

Mr. G. A. Keartland writes me:—"During January, 1897, small flocks of *Melithreptus lactior* were seen among the Eucalyptus saplings and *Bauhinia* trees near the Fitzroy and Margaret Rivers, in North-western Australia. They were very active, and so intent on searching for food that they permitted me to approach within a few yards and fire three shots, before they were disturbed. In April I saw others nearer Derby. They had then paired for breeding, and two incomplete nests were found, suspended in the topmost branches of *Mimosa* and *Bauhinia* trees."

During the first week of February, 1899, Mr. E. J. Harris found this species nesting in the same locality as Mr. Keartland had shot the birds. The nest was cup-shaped, built in the drooping leafy twigs of a *Bauhinia*, about ten feet from the ground, and contained a single egg. The latter is oval in form, gently tapering towards the smaller end, the shell being smooth and slightly glossy, and is of a pale fleshy-buff ground colour, which gradually passes into a warm reddish-buff in the larger end, where there are spots and blotches of a slightly darker hue, intermingled with underlying markings of faint purplish-buff. Length, 0.86 × 0.61 inches. This egg, which resembles a delicately coloured variety of that of *Ptilotis auricomis*, is represented on Plate B. VI., fig. 7.

In the "Catalogue of Birds in the British Museum,"† the type of *Melithreptus lactior*, Gould, is stated to be apparently a very old male in full breeding plumage of *Melithreptus gularis*, and

* Gould, Ann. and Mag. Nat. Hist., Ser. 4, Vol. XVI., pp. 285-6.

† Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 206 (1884).

the name is placed as a synonym of the latter species. That this statement, which has been erroneously attributed to Dr. R. B. Sharpe, is incorrect, has been pointed out several times. In 1884, Mr. C. W. De Vis, M.A., placed the question of the validity of *Melithreptus lactior* beyond doubt, when referring to eight examples, male and female, procured by Mr. K. Broadbent in July, 1883, at the mouth of the Norman River, Gulf District, Queensland. Probably, as pointed out by Dr. E. P. Ramsay in November, 1886,[†] when enumerating the specimens collected by the late Mr. T. H. Bowyer-Bower in the vicinity of Derby, North-western Australia, Dr. H. Gadow confused *Melithreptus lactior* with *M. gularis*, Gould, because he had only a single specimen of the former.

Genus MANORHINA, Vieillot.

Manorhina melanophrys.

BELL BIRD.

Turdus melanophrys, Lath., Ind. Orn., Suppl. I., p. xlii. (1801).

Myzantha melanophrys, Gould, Bds. Aust., fol., Vol. IV., pl. 80 (1848).

Manorhina melanophrys, Gould, Handbk. Bds. Austr., Vol. I., p. 579 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 259 (1884).

ADULT MALE.—General colour above yellowish-olive: upper wing-coverts dusky-grey: quills dark brown, the outer primaries edged externally with grey, the remainder of the quills margined externally with yellowish-olive, which increases in extent towards the innermost secondaries which have both webs yellowish-olive like the back: tail feathers dull yellowish-olive, glossy on their under surface when viewed in certain lights: a large spot in front of the eye bright yellow, bordered above by a narrow blackish line terminating at either end in a small black spot behind the nostril and above the anterior portion of the eye: behind and below the eye a bare space, above which is a yellowish streak: eyelids black: anterior portion of the cheeks blackish: all the under surface yellowish-olive, paler than the upper parts and of a more distinctly yellow shade, particularly on the abdomen: bill yellow; bare space behind and below the eye orange-red: legs and feet rich chrome-yellow: iris greyish-brown. Total length in the flesh 7.5 inches, wing 3.7, tail 3.25, bill 0.4, tarsus 0.87.

ADULT FEMALE.—Similar in plumage to the male.

Distribution—Southern Queensland, New South Wales, Victoria.

THIS well-known species was described by Latham in his "Index Ornithologicus,"[‡] as *Turdus melanophrys*, a name founded on the "Black-browed Thrush" of his "General Synopsis of Birds."[§] The latter, he states, "inhabits New South Wales, where it is known by the name of *Dilbong*. Described from a drawing of Mr. Lambert." There is no doubt, from Latham's description of the elevated feathers of the yellow loreal patch, it was intended for the present species, otherwise "size of the Song-Thrush, plumage in general pale olive-brown" is somewhat misleading. Bonnaterre and Vieillot correctly described this species in 1823 under the name of *Manorhina viridis*, from specimens in the Natural History Museum and private collections in Paris.

In the "Catalogue of Birds in the British Museum" Dr. Gadow points out the differences between the genera *Manorhina* and *Myzantha*, but considers the latter only subgenerally

* Proc. Roy. Soc. Queensland, Vol. I, p. 156 (1884).

† Proc. Linn. Soc. N.S. Wales, 2nd Ser., Vol. I, p. 1093 (1887).

‡ Ind. Orn., p. xlii (1801). § Gen. Syn. Bds., Suppl. ii., p. 185.

Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 258 (1884).

distinct, and unites it with *Manorhina*. Undoubtedly the two are closely allied, but I think the characters pointed out, and the unique crest-like form of the loreal feathers of *Manorhina*, warrant their separation.

The Bell-bird is principally an inhabitant of the dense coastal brushes and contiguous mountain ranges of South-eastern Australia. There are numerous specimens in the Australian Museum collected in different parts of Eastern New South Wales, and two procured by Mr. K. Broadbent in the Darling Downs District, Southern Queensland. In New South Wales I have met with it principally between Gosford and Ourimbah on the northern side of the Hawkesbury River, in the gullies below Bulli Pass and other parts of the Illawarra District to the head of Twofold Bay, near the southern boundary of the State. In somewhat similar country at the foot of the Strzelecki Ranges, in South Gippsland, Victoria, I first met with it in my early collecting days. It is extremely local in habits, giving preference to patches of scrub growing in swampy situations, or vine-covered shrubs sheltered above by trees of larger growth. During many visits to South Gippsland and different parts of the Hawkesbury River District, I have noted that these birds usually frequented the same spots season after season. In many of its actions it resembles the well-known Garrulous Honey-eater, or Miner, clinging head downwards to branches, and closely inspecting an unwelcome intruder. Although of an inquisitive disposition it fortunately lacks the pertinacity of *Myzantha garrula*, in following one through the bush, and uttering its warning cries. If disturbed it frequently takes refuge among the leafy branches of wide-spreading and lofty Eucalypt. When passing from one tree to another it flies in a peculiar manner, somewhat resembling the exertions of a fledgeling during its first attempt at flight.

The vernacular name has been given to this species from the short bell-like tone of its principal note. To hear the notes uttered by numbers of these birds when approaching a patch of country they are located in sounds "like silver bells from a distant shrine." From the similarity of the Bell-bird's plumage to the surrounding verdure, and its ventriloquial powers, the birds themselves when perched are not at first easy to discover.

The stomachs of specimens examined contained only the remains of insects, principally beetles.

The nest is an open cup-shaped structure, and in New South Wales is often formed of *Casuarina* leaves and thin dried plant stems matted together with spiders' webs, and coated externally with a pale green lichen, the interior being lined wholly with *Casuarina* leaves or plant fibre. The nests vary in material according to the position in which they are built; one I found in dead foliage was a very flimsy structure, and was devoid of the outer covering of moss, being outwardly formed of thin dried woolly fern stems, and closely resembled in colour its surroundings. As a rule, however, I have generally found that a pale green barbed lichen is more or less used in their outer construction. An average nest measures externally three inches and three quarters in diameter by two inches and a quarter in depth, internally two inches and three-quarters in diameter by one inch and three-quarters in depth. The nest is attached by the rim to a thin forked horizontal branch of any tree, low shrub, or to the stems of a climbing plant. Little or no preference is shown in the tree selected as a nesting site, but I found more nests built in the Common Sarsaparilla (*Smilax australis*) that overrun many of the shrubs and trees in the brushes at Ourimbah, than elsewhere, and at heights varying from eighteen inches to twenty feet from the ground. The late Mr. H. G. Evered, of Melbourne, forwarded me a nest of this species which he had taken in the reed-beds on Gulpha Station, near Mathoura, Southern New South Wales, and I saw several sets of eggs in his collection, which he informed me were taken from nests built in similar situations.

The eggs, usually two sometimes three in number for a sitting, are oval in form, the shell being close-grained, smooth and slightly lustrous. They vary in ground colour from a fleshy-buff to a rich reddish-buff, and are spotted and blotched with purplish-red and purplish-brown, and a few faint underlying markings of dull purplish-grey. As a rule the markings predominate on the larger end, where the ground colour, too, is often slightly richer, but in some they are almost uniformly distributed over the shell. A remarkably handsome set of two I took at Ourimbah on the 25th November, 1899, are of a faint fleshy-buff ground colour, one has a zone of blotches on the larger end, on the other the markings also are in a zone, but are smaller, and towards the thinner end are two large blotches of purple and brown; interspersed with the markings on the thicker end of this specimen the dull purplish-grey underlying ones appear to have a faint bloom on them. Length (A) 0.95 × 0.7 inches; (B) 0.93 × 0.67 inches. Another set of two taken the same day, are of a rich reddish-buff ground colour, and the purplish-brown and purplish-grey spots and blotches are uniformly distributed over the shell. Length (A) 0.85 × 0.66 inches; (B) 0.86 × 0.66 inches.

Young birds resemble the adults but are much duller in colour, the yellow loreal spot is smaller, and the feathers on the forehead, occiput, sides of head, ear-coverts and upper throat have a dusky wash. Wing, 3.4 inches.

Two, if not three broods are reared during the normal breeding season in New South Wales, which commences in August and continues to January. As an instance of late breeding Mr. J. A. Boyd informs me that at Eden, Twofold Bay, he caught a couple of young Bell-birds on the 6th March, 1906. At Ourimbah Mr. S. W. Moore and his son, Mr. W. L. Moore, on the 2nd October, 1899, found two nests, each with two eggs, one set partly, the other much incubated, one apparently new nest and two nests each containing two young ones. In the same locality on the 25th November, 1899, nearly two months later, I saw many old nests and fledgelings, and found two nests, one with two slightly, the other with two heavily incubated eggs. On the 26th December, 1902, in the same place I observed fledgelings that had but recently left the nest.

Genus MYZANTHA, Vigors and Horsfield.

Myzantha garrula.

GARRULOUS HONEY-EATER.

Merops garrulus, Lath., Ind. Orn., Suppl., p. xxxiv (1801).

Myzantha garrula, Gould, Bds. Austr., fol., Vol. IV., pl. 76 (1848); *id.*, Handbk. Bds., Vol. I., p. 574 (1865).

Manorhina garrula, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 260 (1884).

ADULT MALE—*General colour above light greyish-brown, the feathers of the hind neck having dull whitish margins, and those on the back having distinctly darker centres; upper wing-coverts like the back, the lesser and median series having a blackish wash; quills dark brown, the primaries externally edged with light greyish-brown, their apical portion margined with white; outer webs and tips of the innermost secondaries light greyish-brown, the outer webs of the remainder margined with olive-yellow; tail brown tipped with brownish-white, more largely on the outermost feathers, and passing into almost pure white on their inner webs and towards the ends, the central feathers washed with light greyish-brown except near their shafts; forehead, lores, and fore parts of cheeks greyish-white; crown of the head dull black; sides of the throat blackish-grey, ear-coverts silky-black; throat whitish with a dusky grey streak down the centre, the feathers on the chin tipped with pale yellow; remainder of the under*

surface greyish-white, passing into almost pure white on the abdomen and under tail-coverts: the apical portion of the feathers of the fore neck and breast submarginally bordered with dusky-grey; bill orange-yellow; legs and feet yellow, darker in front; bare space behind and below the eye yellow: iris light brown. Total length in the flesh 10 inches, wing 5.9, tail 5, bill 0.7, tarsus 1.3.

ADULT FEMALE—Similar in plumage to the male, but smaller. Wing 5.5 inches.

Distribution—Queensland, New South Wales, Victoria, South Australia, Tasmania.

THE well-known Garrulous Honey-eater, Miner, or Soldier-bird is widely distributed over a large portion of Eastern Australia, and is likewise found in Tasmania. It was described by Dr. Latham in 1801, in his "Index Ornithologicus" as *Merops garrulus*, a name founded on the "Chattering Bee-eater" of his Supplement to the "General Synopsis of Birds."¹ I would here point out that in the copy of Latham's work in the Australian Museum Library, and formerly the property of the late Mr. William Swainson, whose name is stamped on the calf binding of each volume, the date of publication on the title page of Supplement II, is 1802,

yet Latham gives references, page, and number, to many descriptions in it, when he characterised each species in his "Index Ornithologicus" and which bears the date of publication of the previous year 1801.



GARRULOUS HONEY-EATER.

In a number of adult specimens now before me, some of them procured in the breeding season, the feathers of the back are more or less distinctly margined with pale olive-yellow, and in a less degree the basal portion of the outer webs of the central tail feathers. In the specimens destitute of the olive-yellow wash on these parts, the feathers are

worn and abraded, and the birds were apparently near the moult. The wing-measurement of an adult male obtained by Mr. George Masters, in April 1867, at the Ouse River, Tasmania, is 5.9 inches, and of an adult male procured by him in August 1870, at Gayndah, on the Burnett River, Queensland, 5.6 inches. Of adult males obtained in the Blue Mountains, New South Wales, the wing-measurement varies from 5.7 to 5.9 inches.

There is a beautiful albino of this species in the Australian Museum collection, presented by Mr. F. Mack.

Open forest and partially cleared lands are its favourite haunts. Except in the breeding season it is usually met with in small flocks. When disturbed they generally congregate in the dead branches at the top of a tree, uttering at the same time loud, shrill notes of alarm. The warning cries of this species are only too well known to many who are in search of game, for it will persistently follow one from tree to tree. This habit was known to the early settlers in Australia, for over a century ago Latham in describing it under the name of "Chattering Bee-eater"¹ remarks:—"This bird inhabits New South Wales, and is said to be a noisy chattering species, insomuch as to give the alarm, in the manner of the Jay, so as to prevent the sportsmen getting a shot at the *Pattogorang*."

Although this species is common in the open forest lands about Blacktown, where it breeds, I have only seen it during one season in the suburbs of Sydney. This was at Roseville,

¹ Gen. Syn. Bds., Suppl. II., p. 154 † *Loc. cit.*, p. 153.

a pair taking up their quarters in an orchard during the drought of 1902. I first saw them on the 17th May, and they remained throughout the year, rearing a brood of three young ones in a tree close by. The latter when fledged were mobbed by other species, and particularly by *Ptilotis auricomis*. They were not seen after the end of January. At Hobart, Tasmania, I have seen this species frequenting the Government Domain and Botanic Gardens.

Another habit of this bird is, when one remains perfectly quiet beneath the tree it is in, it will gradually descend from branch to branch, often holding by its claws or hanging head downwards peering about in an inquisitive manner until within a few feet of the intruder. In confinement, too, their actions are most grotesque, clinging to the roof of their cage, and assuming every conceivable attitude. They soon become exceedingly tame, and I have had them come down and take sugar, or gently peck one's finger when placed between the wires.

The normal food of this species is the nectar and pollen of flowers and insects. Stomachs of these birds, shot in August, contained only the remains of insects, principally black beetles, caterpillar skins, and a few small pieces of gravel. It is, however, one of the worst bird pests orchardists and viticulturists have to contend with, for it destroys large quantities of fruit and grapes. In New South Wales it is especially destructive in the Hunter River, Wagga, and Albury Districts.

The nest is an open cup-shaped structure rather irregularly formed externally of long thin twigs and coarse grasses, slightly held together with cobwebs and egg bags of spiders, lined inside with fine fibrous rootlets and dried grasses, and at the bottom with a quantity of cowhair, fur, wool or other soft material. An average nest measures externally, omitting straggling twigs and grasses, seven inches in diameter by four inches and a half in depth, the inner cup measuring three inches and a quarter in diameter by two inches and a quarter in depth. The nesting site is varied; in gum-sapling and *Banksia* scrubs it is built between upright forks, often within hand reach, and six to ten or twelve feet from the ground. In open forest lands it is frequently built among the terminal leafy twigs near the end of a branch, at an altitude of thirty or forty feet from the ground. That the nests of this species are as a rule easily accessible is proved by the numerous specimens of eggs of the Garrulous Honey-eater to be found in collections formed by bird-nesting boys in the country districts of South-eastern Australia.

The eggs are usually three, sometimes four in number for a sitting, and are extremely variable in shape, size, and disposition of markings. They are elongate oval, oval, or rounded oval in form, the shell being close grained, smooth and more or less lustrous. In ground colour they vary from almost pure white, faint reddish and buffy-white to a pale reddish and creamy-buff, which is freckled, spotted or blotched with different shades varying from light red and reddish-brown to rich chestnut and purplish-red, intermingled with less numerous underlying markings of violet or purplish-grey. In some the markings are unevenly distributed over the surface of the shell, in others they predominate chiefly on the thicker end, where they often form a more or less well defined cap or zone. In a large number of sets now before me many from widely separated districts resemble each other, thus eggs from the open forest lands of Blacktown, Wellington, Dubbo, and the Blue Mountains, New South Wales, are similar to specimens obtained from Western Port Bay, Victoria, and near Hobart, Tasmania, and are of the most common type. Sets from the Upper Clarence River may be distinguished by their smaller size and markings, and resemble others taken in the Dawson River District, Queensland, but among the former are some with rich ground colours and distinctly darker markings which I have seen from no other locality. Of so different a character are several sets of eggs collected by Mr. G. Savidge, about Copmanhurst, that when he first showed them to me I was puzzled to know what species to attribute them to. A set of three taken by him on the 30th August, 1897, measures:—Length (A) 0.97 × 0.7 inches; (B) 0.93 × 0.69 inches; (C) 0.95 × 0.71 inches.

A set of three taken by Mr. R. Grant, at Lithgow, on the Blue Mountains, on the 10th October, 1895, measures:—Length (A) 1·17 × 0·78 inches; (B) 1·21 × 0·77 inches; (C) 1·17 × 0·77 inches. A set of three taken in the neighbourhood of Hobart, Tasmania, measures:—Length (A) 1·02 × 0·77 inches; (B) 1·05 × 0·8 inches; (C) 1·08 × 0·8 inches.

In the northern coastal districts of New South Wales this species is an early breeder, Mr. G. Savidge noted it building in June, and has taken eggs on the 4th, 17th, and 27th July, and has seen nests with young during that month. From Blacktown, which is twenty-one miles west of Sydney, to Dubbo, two hundred and eighty-three miles inland, nests with eggs are more common from August to the end of October, although in the former district Mr. S. W. Moore obtained a nest with three fresh eggs on the 26th June, 1896. At Roseville I saw fledgelings being fed by the parents in the middle of January. At Yendon and Western Port, Victoria, I found nests with eggs plentiful in September and October. From the Dawson River District, Queensland, I received sets taken by Mr. H. G. Barnard, on the 6th August, 25th September, and the 23rd October, 1892. In Tasmania Mr. E. D. Atkinson informs me that his brother, the Rev. H. D. Atkinson, has found nests with eggs from the 28th September to the 9th November. Mr. R. N. Atkinson informs me that in company with his cousin, the Rev. H. B. Atkinson, a nest was found on the 8th November, 1906, at Evandale, Tasmania, containing the unusual number of six eggs, which were fresh; another nest contained four, two of the eggs being of the average size, and two quite one-third smaller.

Myzantha flavigula.

YELLOW-THROATED MINER.

Myzantha flavigula, Gould, Proc. Zool. Soc., 1839, p. 143; *id.*, Bds. Austr., fol., Vol. IV., pl. 79 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 578 (1865).

Manorhina flavigula, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 261 (1884).

ADULT MALE—General colour above light brownish-grey, the feathers on the hind neck darker brown towards the tips and having a subterminal whitish cross-bar, some feathers on the back having darker brown centres; rump and some of the longer upper tail-coverts white; lesser and median upper wing-coverts like the back with darker brown centres, the greater coverts brown on their inner webs, greyish-brown on their outer webs, which are externally washed with bright olive-yellow; quills brown, the innermost secondaries greyish-brown, all but the latter and the outermost primaries externally margined with bright olive-yellow; tail-feathers dark brown externally margined with olive-yellow, the tips white with a pale brownish wash, which is more conspicuous on the outer webs; forehead and snicuput dull olive-yellow; lores, a narrow ring around the eye and feathers immediately below the bare space beneath the eye blackish, passing into a silvery-grey with blackish centres on the ear-coverts; cheeks white separated from the blackish feathers above on the anterior portion by a line of bright yellow feathers; chin and fore part of cheeks washed with bright yellow, centre of the throat greyish-white, sides of the throat bare; fore neck and upper breast greyish-white with a submarginal brown bar and a indistinct whitish tip to most of the feathers, those on the sides of the fore neck being tipped with light gamboge-yellow, forming there a more or less well defined crescentic patch; remainder of the under surface and under tail-coverts white; bill and bare space behind and beneath the eye bright yellow; legs and feet yellow, darker in front; iris light brown. Total length in the flesh 10 inches, wing 5·4, tail 4·6, bill 0·65, tarsus 1·1.

ADULT FEMALE—Similar in plumage to the male but smaller. Wing 5 inches.

Distribution—Queensland, New South Wales, South Australia, Central Australia, Western Australia.

THE range of the Yellow-throated Miner extends right across the inland portions of the Australian continent. In New South Wales it takes the place of *Myzantha garrula* in the drier portions of the State. There are numerous specimens in the Australian Museum collection, obtained on the Lachlan, Darling, Namoi and Mehi Rivers. Specimens were procured by the members of the Horn Scientific Expedition in Central Australia in 1894. Mr. G. A. Keartland informs me that he obtained examples in the Great Desert in Western Australia, while with the Calvert Exploring Expedition in 1896. Mr. Edwin Ashby sent specimens for examination collected by him at Callion, Western Australia, and Nackara, South Australia. In the latter State Mr. George Masters, while collecting on behalf of the Trustees of the Australian Museum, procured birds in the Flinders Range. From Port Augusta, Dr. A. Chenery writes me:—" *Myzantha flavigula* is common here. I have taken nests in Sandalwood trees on plains and in the gum creeks of Flinders Range. I saw a pair building at the Ostrich Farm in May, 1903."

Relative to a trip made to the Mount Gunson District, in July and August, 1900, Dr. A. M. Morgan writes me:—" *Myzantha flavigula* was fairly common, both in scrubs and gum creeks. Several nests were found: one on the 30th July with four slightly incubated eggs, two more on the following day with three fresh eggs, and another in a mulga with three half-grown young. Two nests were found on the 7th August at Elizabeth Creek in gum trees, one with three fresh, the other with three incubated eggs. A nest found at Arcoona on the 10th August contained three eggs in an advanced stage of incubation, and another found at Port Augusta in a gum tree on the 14th August had three nearly fresh eggs. During my visit, in company with Dr. A. Chenery, to the Gawler Ranges, in August, 1902, this species was observed common everywhere throughout the trip."

At Tyndarie, Mr. James Ramsay procured sets of three and four, and one of five eggs. Mr. Edward Lord Ramsay, who found this species breeding freely on Wilgaroon Station, in Western New South Wales, took a nest on the 29th September, 1889, in a mistletoe of a "Leopard" tree, twenty-five feet from the ground, containing four eggs; another was built twelve feet from the ground in a lot of vines growing on a mulga, containing three eggs; another found the same day and built in an "Ironwood" tree nine feet up, contained five fresh eggs. On the Namoi River I saw this species feeding fledgelings in November 1896, and in the same month of the following year Mr. J. A. Thorpe and myself obtained adults and young on the banks of the Mehi and Gwydir Rivers. In habits this species resembles *M. garrula*. At Woodside near Coonamble, both this species and *Myzantha garrula* were very tame, bathing fearlessly after a shower of rain in the spouting surrounding the verandah of the house, and only a few feet above our heads.

Writing from the Mossgiel District in 1886, the late Mr. K. H. Bennett remarks:—"In the early days of the occupation of this part of New South Wales *Myzantha flavigula* was rarely met with away from the river, but of late years, owing to the conservation of water, it has become plentiful wherever there is timber. It commences to breed in August, and builds a somewhat deep cup-shaped nest in a small tree, some eight or ten feet from the ground." Writing later on the 13th October, 1889, when resident on Yandembali Station, he remarks:—"A number of *Myzantha flavigula* inhabit the clump of trees around the homestead, and many of them are often in the house or on the verandah. At meal times they fly fearlessly into the room and alight on the table, although half a dozen of us may be sitting at it. They perch on the sugar basin and eat the sugar as unconcernedly as if no one were present. If the cover should be on the sugar basin they will readily take sugar from the hand of any one at the table. It is also a common occurrence to see the children when eating cake on the verandah surrounded by these birds, who are busily engaged in picking up the falling crumbs, some of the birds even perching on them."

The nest is somewhat roughly formed externally of fine twigs and plant stems, slightly matted together with spiders' webs, the inside which is neatly cup-shaped, being lined with dried

grasses, hair, fur, or wool. An average nest measures externally seven inches in diameter by four inches in height, the inner cup measuring three inches and a quarter in diameter by two inches and a half in depth. It is usually built in a low tree from seven to ten feet from the ground, but nests I saw at Narrabri and Moree were built among the terminal leafy branches of trees fully thirty feet from the ground.

The eggs are usually four, sometimes three, and occasionally five in number for a sitting, oval or elongate-oval in form, the shell being close-grained, smooth, and more or less lustrous. They vary in ground colour from a rich salmon to a salmon-red, some have the ground colour distinctly tinged with buffy-yellow, others are dark salmon-red on the larger end and gradually becoming paler towards the smaller end. Typically they are freckled and spotted with a richer and darker shade of the ground colour, in some the markings are almost invisible, in others bold and distinct, but as a rule blend fairly well with the ground colour. Some have the markings uniformly distributed over the shell, in others they are confined to or predominate on the thicker end, where they not infrequently assume the form of a clouded cap or zone. A set of four in the Australian Museum collection, taken on the 28th October, 1897, measures:—Length (A) 1.03 × 0.75 inches; (B) 1.03 × 0.76 inches; (C) 1.08 × 0.73 inches; (D) 1.04 × 0.73 inches. A set of five small and glossy eggs taken by Mr. James Ramsay, at Tyndarie, on the 29th September, 1879, measures:—Length (A) 0.93 × 0.73 inches; (B) 0.92 × 0.73 inches; (C) 0.93 × 0.72 inches; (D) 0.92 × 0.72 inches; (E) 0.93 × 0.72 inches. Typically the eggs of this species may be distinguished from those of *Myzantha garrula* by their richer ground colour.

Young birds resemble the adults, but the upper parts are more distinctly washed with pale brown, and the tips of the tail feathers are brownish-white; on the under surface the feathers are downy, and those on the fore neck and breast have only a faint indication of the brown submarginal bar on the apical portion, and some of the feathers behind the ear-coverts are yellow like those on the sides of the neck. Wing 4.7 inches.

This bird is an early breeder in South Australia, Dr. A. Chenery having observed it building in May while several nests with eggs, and one with half-grown young were found by Dr. Morgan at the end of July. In New South Wales nests with eggs may be obtained in August, but are more numerous in September and October. At Narrabri and Moree I observed this species sitting, and obtained young birds in November.

Myzantha lutea, inhabiting North-western Australia and the Northern Territory of South Australia is a close ally of this species and is its representative in those parts of the continent.

This species is one of the foster parents of the Pallid Cuckoo. At the meeting of the Linnean Society of New South Wales held on the 28th June, 1905, I exhibited a set of eggs consisting of three of the Yellow-throated Miner and one of the Pallid Cuckoo. These eggs from the collection of Mr. W. L. Moore, were taken in September, 1901, on Yerranbah Station, New Angledool, Northern New South Wales.

Myzantha obscura.

SOMBRE MINER.

Myzantha obscura, Gould, Proc. Zool. Soc., 1840, p. 159; *id.*, Bds. Austr., fol., Vol. IV., pl. 77 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 576 (1865); Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 260 (1884).

ADULT MALE—*Like the adult male of MYZANTHA FLAVIGULA*, Gould, but of a darker and duller shade of grey, particularly on the sides of the neck and the under parts, and having darker olive-yellow margins to the quills and tail feathers, the latter with small brownish-white tips; ear-coverts blackish,

the feathers between the latter and the bare space on the sides of the throat dull grey, and only a few of the feathers on the sides of the neck tipped with dull yellow. Total length 9·8 inches, wing 5·25, tail 4·6, bill 0·82, tarsus 1·15.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Western Australia.

THE Sombre Miner is an inhabitant of South-western Australia. Gould, who described this species, states that in this portion of the continent it represents the *Myzantha garrula* of New South Wales. Although of a distinctly darker hue, in the general character of its markings, *Myzantha obscura* is more closely allied to *M. flavigula*. The latter species is also found in Western Australia. Collecting on behalf of the Trustees of the Australian Museum, Mr. George Masters procured fifteen specimens of *M. obscura* at Mongup, Salt River, Western Australia, in 1868-9. Specimens from this locality are slightly duller in colour than an example sent me for examination and obtained by Mr. Edwin Ashby near Perth.

A nest in the Australian Museum collection, taken by Mr. Tom Carter, at Broome Hill, South-western Australia, on the 3rd November, 1906, is a large open cup-shaped structure, externally formed of thin twigs, and long plant stems, the inside being thickly lined with fine dried grasses, with which is intermingled some reddish bark-fibre and *Zamia* wool. Externally it averages six inches in diameter by three inches in depth, the inner cup measuring three inches in diameter by two inches in depth. It was built about fifteen feet from the ground in a White Gum sapling, and contained two eggs. Mr. Carter informs me that he had a set of three eggs brought him that were taken at the end of January 1907.

The eggs sent show that they vary in shape and colour as much as those of *Myzantha flavigula*. One is rounded oval in form with a rich reddish-buff ground colour, over which is thickly distributed dots, spots, and blotches of a darker shade of the ground colour, but particularly on the thicker end, where a cap is formed. Length (A) 0·98 × 0·77 inches. The other is elongate-oval in form tapering gently towards the smaller end, and of a pale salmon-red ground colour, which is sparingly dotted, spotted and blotched with chestnut- and purplish-red, the markings being larger and predominating on the thicker end. Length (A) 1·08 × 0·7 inches.

Two eggs in Mr. G. A. Keartland's collection, taken at Subiaco, near Perth, Western Australia, in September 1897, are short ovals in form, the shell being smooth, close-grained and almost lustreless. They are of a rich orange-buff with numerous spots and dots of dull chestnut and purplish-red, the markings on one specimen being almost obsolete, and barely distinguishable from the ground colour. Length (A) 1·03 × 0·79 inches; (B) 1·07 × 0·77 inches. The eggs of this species cannot be distinguished from those of its close ally *Myzantha flavigula*.

Young birds resemble the adults but have a pale brown wash on the upper parts, and there is scarcely any indication of the dull yellow tips to the feathers on the sides of the neck. Wing, 4·7 inches.

Family NECTARINIIDÆ.

Genus CINNYRIS, *Cuvier*.

Cinnyris frenata.

SUN-BIRD.

Nectarinia frenata, S. Müll., Nat. Gesch. Land- u. Volkenk., p. 173 (1843).

Nectarinia australis, Gould, Handbk. Bds. Austr., Vol. I, p. 584 (1865); *id.*, Suppl. Bds. Austr., fol., pl. 45 (1869).

Cyrtostomus frenatus, Salvad., Orn. Pap. et Molucc., Pt. II, p. 265 (1881).

Cinnyris frenata, Gadow, Cat. Bds. Brit. Mus., Vol. IX., p. 85 (1884).

ADULT MALE—General colour above olive-yellow, slightly brighter on the upper tail-coverts; lesser wing-coverts like the back, the median and greater coverts and quills brown, externally margined with dull olive-yellow; tail feathers black, all but the central pair tipped with white, more largely on the outermost one on either side; forehead, crown and sides of the head olive-yellow with a slight wash of brown; a narrow line extending over and behind the eye, and another one beneath the eye and the ear-coverts bright yellow; chin, throat and fore neck dark metallic-blue, purplish-blue in the centre; remainder of the under surface and under tail-coverts deep yellow, the feathers on the sides of the upper breast orange-yellow; bill black; legs and feet black. Total length 4·5 inches, wing 2·2, tail 1·4, bill 0·8, tarsus 0·55.

ADULT FEMALE—Differs from the male in having the throat and fore neck uniform deep yellow with the remainder of the under parts; the chin slightly paler yellow, and no orange-yellow feathers on the sides of the upper breast.

Distribution—The coastal districts of Eastern Queensland.

ONLY a single representative of the large Family Nectariniidæ occurs in Australia. The present species is widely distributed, being found in the Celebes, and various islands of the Moluccas. Aru, Admiralty, Solomon, and Torres Strait groups, also in New Guinea and some of the contiguous islands. The members of the Chevert Expedition obtained specimens on Palm, Sue, Warrior, and Albany Islands; and on the mainland of Australia, at Cape York and Cape Grenville. During the Voyage of H.M.S. "Alert" specimens were procured on Prince of Wales Island and on Thursday Island. In Australia its recorded range extends from Cape York, throughout the coastal districts to Port Denison, and is represented in the Australian Museum by examples from both of these localities, also from the neighbourhood of Cardwell and Cairns. I have also received its eggs from Cooktown, and the Bloomfield, and Herbert River Districts. The late Mr. George Barnard informed me that his son Mr. W. B. Barnard, found a nest of this species, just ready for eggs, near Rockhampton early in October 1890, and that he procured the female. This is the farthest point south I have known the Sun-bird to be found.

Respecting the nesting habits of this species I am indebted to Mr. J. A. Boyd who kindly supplied me with the following interesting notes from time to time during many years' residence on Ripple Creek Plantation, Herbert River, North-eastern Queensland:—"On the 30th December 1890, I took a nest of the Sun-bird with two fresh eggs. It was built under the eaves of a grass "humpy," close to the door and was founded on a piece of fibre used for tying on thatch, and in consequence of this being short the birds have not formed the usual long tail below the nest. On the 12th October, 1892, I found another nest built on a root hanging through a depending bank which contained two young. On the 4th August, 1894, a Sun-bird began building on a piece of rope hanging from a rafter in the verandah of my brother's house and on the 6th September, 1894, the nest contained young birds. My own pair, although I have hung out most tempting pieces of rope, refuse to utilize any of them as a nesting site. I watched these birds pick out insects from the cracks of the verandah floor when they have a brood to maintain. On the 27th October, 1894, I found a nest built on a vine in scrub; it contained two eggs. The pair of Sun-birds that frequented my brother's house have now, February 1895, bred three times in the verandah, twice in the same place, pulling down and replacing the bottom part of the nest on the second occasion.

"Another pair built at my brother's house, and have now, 15th March, 1895, young nearly ready to fly. The nest is fixed on the rope suspending the canvas bag in which butter, etc., is put to cool, hanging in the covered way from the kitchen to the house. People must pass within three feet of it at least one hundred times a day, and the piano is only a few yards off. On the 12th April, 1895, I saw that a young Sun-bird, bred here, had taken on its first moult, consisting of a black band down the throat, the feathers on each side being very pale

yellow; it was in company with the adult male. On the 20th September, 1895, a Sun-bird was building a nest in my brother's verandah, and attached it to the tendril of a grape vine, whilst here a pair are nesting on the string that opens and shuts the ventilator of my bedroom. On the 15th November, 1895, I noticed a nest hanging from the wooden shutter that serves as a window in the cottage occupied by our baker; there are two little children always playing inside, and it is within a few yards of the main road. A Sun-bird has a nest now, 21st October, 1896, in our stableman's verandah which is often occupied by himself, wife, four children and three dogs, yet the birds do not show any sign of fear. The Sun-birds are now, 1st January, 1897, rearing their second brood, one nest here has two eggs, and at my brother's house a pair have young; they generally use the old nest for the second hatching. A pair of Sun-birds that built their nest here last May and then deserted it, returned some time ago and now, 3rd August, 1897, have young nearly ready to fly. *Cinnyris frenata* is sitting again, 3rd September, 1897, in the old nest, they never even repaired it, the tail is gone and the aperture is nearly half across the nest, but the female is quite content and let me touch her house before she flew out. On the 23rd January, 1897, and for the third time this season, *Cinnyris frenata* began building, choosing a most peculiar place. Some time ago I got a flying squirrel's skin from a black, and hung it by the tail in the back verandah close to one of the doors of the bedroom. The birds have started their nest on the tail and are building down to the head; it was afterwards deserted, probably by another skin falling down that was in close proximity."

Writing on the 25th May, 1897, Mr. Boyd remarks:—" *Cinnyris frenata* is still building. My pair started a nest on a bit of rope in the front verandah a few days ago, and now it is nearly finished; this is their fourth nest, they had the first built on the 8th of August, 1896."

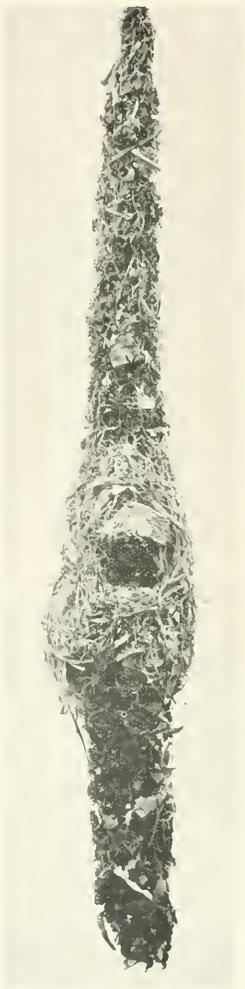
Mr. Boyd kindly forwarded me the partially constructed nest, built on the furred side of a flattened flying-squirrel's skin, also several completed nests and sets of eggs, and a photograph of the nest suspended from the wooden shutter.

A nest taken on the 30th January, 1891, is a long fusiform structure, with an entrance about half way down one side, which is protected by a hood, there being a quantity of nesting material above and below the nest proper, as is usually seen in the nests of *Gerygone albigularis*. It is formed of shreds of bark and bark fibre, dried grasses, and portions of leaves, being lined on the inside with finer grasses and white plant down. The whole exterior is ornamented and held together with a fine network of spider's web. It measures ten inches in length over all, the nest proper being five inches in length by three inches in diameter, and across the entrance one inch, from top to bottom of protecting hood three inches, from the bottom of nest to end of tail-like appendage three and a half inches. Another nest is formed to a large extent with small pieces of white paper-like bark of a *Melaleuca* and fine dried grasses, but has the same network covering of spiders' webs. It measures fourteen inches in length, seven inches of it being superfluous nesting material of the tail-like appendage below the nest proper. Some nests are oval in form with only a few inches of nesting material above the domed portion of the structure.

The eggs are usually two in number for a sitting, oval in form, some specimens being rather pointed at the smaller end, the shell being very close-grained, smooth and lustrous. They vary from a dull greenish-grey to an ashy or greyish-white ground colour, which is more or less obscured by numerous freckles or stipplings of light brown. Typically the markings are evenly distributed over the shell, but in some they predominate or form a clouded band on the larger end. Two specimens in the Australian Museum collection measure:—Length (A) 0.66 × 0.42 inches; (B) 0.67 × 0.44 inches. A set of two taken by Mr. J. A. Boyd on the 30th December, 1890, measures:—Length (A) 0.68 × 0.47 inches; (B) 0.66 × 0.47 inches.

Writing me from Hambleton, near Cairns, in January 1907, Mr. A. F. Smith remarks:—"I am sending you two nests of *Cinnyris frenata*, both depart in opposite directions from the usual

shape. A typical nest that I saw being built was destroyed by a cat, or some animal just after the eggs were laid. The long nest was built in a narrow passage-way connecting the house with the kitchen. A wire hook



NEST OF SUN-BIRD.

suspended from one of the side beams supporting the roof of this landing, had previously been used for a fern basket, which was removed, and then the bird built there. The female used to sit steadily, although people were constantly passing to and fro. The female seems to do all the work, builds the nest, does all the sitting, and feeds the young. I have never seen the male do anything except hang on to the nest sometimes while it is being built, when he chatters away and seems to be criticizing her work. Several times when I have taken hold of a Sun-bird's nest to look in, the hen has always flown out and called her mate, who immediately appears, so he is evidently not far away from the nest. The short nest was suspended from a leaf of a small Tamarind Tree alongside a verandah, and about five feet from the ground. Soon after the eggs were laid I found the nest on the ground." Both nests are spindle-shaped in form and are built externally of similar material; shreds of bark, bark and cocoa-nut fibre, portions of dead leaves, plant down, spider webs and a quantity of wood-borings made by the larvæ of a moth, the inside being lined with a mixture of plant-down and fowl's feathers. The short nest has only a small quantity of nesting material above the domed portion of the nest, and measures over all eight inches in length. The long nest here figured, it will be seen, has a quantity below as well as above the nest proper, and measures eighteen inches in total length, by three inches in diameter at its widest part.

Immature males resemble the adult female but are of a duller yellow on the under surface, and there is a line of metallic purplish-blue feathers from the chin down the centre of the throat and foreneck. The wing-measurement of a specimen in the Australian Museum collection in this stage of plumage is 2.15 inches, which nearly equals that of the adult.

September to the middle of February constitutes the normal breeding season of the Sun-bird, but, as will be seen from Mr. Boyd's notes, nests may be found in almost any month, one pair of birds that he had breeding under his verandah rearing four broods from August, 1896, to August, 1897.

This species is one of the foster parents of the Bronze Cuckoo. One set of eggs taken by Mr. Boyd and forwarded to me, contained one Sun-bird's egg and one egg of the Bronze Cuckoo (*Lamprococyx flagosus*).

Family ZOSTEROPIDÆ.

Genus ZOSTEROPS, Vigors and Horsfield.

Zosterops lateralis.

SILVER-EYE.

Sylvia lateralis, Lath., Ind. Orn., Suppl., p. lv. (1801).*Dacnis westernensis*, Quoy et Gaim., Voy. de l'Astrol., Tom. I., p. 215, and Atlas, pl. 11., fig. 4 (1830) (breeding plumage).*Zosterops dorsalis*, Gould, Bds. Austr., fol., Vol. IV., pl. 81 (1848) (winter plumage).*Zosterops cerulescens*, Gould, Handbk. Bds. Austr., Vol. I., p. 586 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. IX., p. 152 (1884) (winter plumage); North, Proc. Linn. Soc. N.S.W., Vol. X., 2nd Ser., p. 473 (1896); *id.*, Rec. Austr. Mus., Vol. II., p. 98 (1896).*Zosterops westernensis*, Sharpe, Cat. Bds. Brit. Mus., Vol. IX., p. 155 (1884) (breeding plumage).

ADULT MALE (*Breeding plumage*)—*Hind-neck, mantle, scapulars and upper portion of the back dark ashy-grey; lower back, rump and upper tail-coverts olive-yellow; upper wing-coverts olive-yellow; quills and tail feathers dusky-brown, externally edged with olive-yellow; forehead, crown and sides of head, including the ear-coverts, dull olive-yellow, around the eye a ring of silvery-white feathers, which is broken on the anterior portion by a small black spot in front of the eye, a bluish wash also extending to the feathers below the white eye circle; chin, cheeks, and throat bright yellow; fore neck and breast pale ashy-grey, slightly darker on the sides of the fore neck, and almost ashy-white on the centre of the lower breast; abdomen and flanks pale creamy-brown; under tail-coverts dull white, in some specimens pale yellow; bill brown, the basal half of lower mandible greyish horn-colour; legs and feet grey; iris brown. Total length in the flesh 4.75 inches, wing 2.3, tail 1.75, bill 0.4, tarsus 0.7.*

ADULT FEMALE (*Breeding plumage*)—*Similar in plumage to the male.*

ADULT MALE (*Winter plumage*)—*Differs from the breeding plumage in having the chin and sides of the throat faint olive-yellow, the centre of the throat and the fore neck ashy, the centre of the lower breast and abdomen dull white, and the lower sides of the body deep tawny-buff.*

ADULT FEMALE (*Winter plumage*)—*Similar in plumage to the male.*

Distribution—Southern Queensland, New South Wales, Victoria, South Australia, Tasmania, New Zealand, Norfolk Island.



SILVER-EYE

LATHAM described the type of this species in his "Index Ornithologicus" under the name of *Sylvia lateralis*, which is founded on the Rusty-sided Warbler of his "Supplement to the General Synopsis of Birds," and states there it inhabits New South Wales. I have discarded Latham's prior name of *Certhia cerulescens*, founded on the "Cerulean Creeper," as it is impossible to recognise in the diagnosis or description whether they were intended to characterise the present species. There are about one hundred species of the widely-distributed genus *Zosterops*, eight of

which are found in Australia or the adjacent islands. The present familiar and well-known resident is an inhabitant of Southern Queensland, New South Wales, Victoria, South Australia, Tasmania, and New Zealand, and has also been found by Dr. P. H. Metcalfe on Norfolk Island.

* North, Rec. Austr. Mus., Vol. V., p. 338 (1904).

In Australia it chiefly frequents the coastal and contiguous districts, and does not occur in the dry and arid portions of the States.

In describing *Zosterops westernensis*, Quoy and Gaimard, in the "Catalogue of Birds in the British Museum" Dr. R. Bowdler Sharpe makes the following observations:—"An Australian specimen has been described, and it is extraordinary that a bird which seems to be widely distributed on that continent should so much have escaped notice, the only allusion to the species that I can find in Mr. Gould's work being a passage where he mentions that some specimens of *Zosterops carulescens* have the "throat wax-yellow." It seems to be the *Z. westernensis* (Q. and G.), a species re-instated in the system by Hartlaub (J. f. O., 1865, p. 20.)"

As pointed out by me in the "Records of the Australian Museum,"† after the collection of a large series of skins, at different seasons, in the neighbourhood of Sydney. *Z. westernensis*, Quoy and Gaimard is only the spring and summer livery of *Z. lateralis*.

Taking the two extremes of winter and summer plumage here described, it can be easily understood why each should be thought to belong to a distinct species, and it is only where one has these birds under daily observation, and obtains specimens during every week of the year, that the intermediate stage, or the gradual transition from one phase of plumage to the other, is observed. Typical examples of *Z. lateralis* with the deep tawny-buff flanks and grey throat, the autumn and winter attire of this species, may be obtained in the neighbourhood of Sydney, from the middle of April until the end of August. Some specimens, however, are to be found during June that have not quite lost the summer plumage, and in August others that have already begun to attain their spring livery; these birds have the yellow throat more or less clearly defined. In fact there are specimens in the Australian Museum collection that I shot in company with each other, at Manly on the 13th July, 1888. One is a typical *Z. lateralis*, in winter plumage, the other has a yellow throat, paler than in the breeding plumage, and the flanks light tawny-buff, and not nearly so dark as the typical winter, or even autumn plumage. Dr. E. P. Ramsay, who was with me at the time, then identified the former as *Z. carulescens* and the latter as *Z. westernensis*. There is also another specimen in the collection obtained at Greendale, near Manly, exactly eight years later, by the late Mr. H. J. Ackland. It has the pale yellow throat, but the flanks are slightly darker than the specimen I procured. Both of these specimens were obtained during periods of drought. On the contrary, I have never met with a specimen having the flanks deep tawny-buff in spring or summer. Usually the first indications of losing it, and at the same time acquiring the yellow throat, are seen during a normal winter, about the second week in August, in some seasons a fortnight earlier; but in two specimens examined the grey throat was retained as late as the 19th September. During August and September, however, the gradual transition from the winter to spring plumage is slowly taking place, and by the middle of October not a bird is to be seen with the ashy throat and deep tawny-buff flanks. Specimens obtained in November and December have the throats of a brighter yellow than at any other time of the year. In late summer the throat is slightly paler than in the spring, and this livery is retained until the beginning of March. The flanks then become darker, increasing in intensity of colour from that time forward, the yellow feathers on the throat gradually pass into grey, until the autumn livery is again fully assumed by the greater number of birds at the end of April. All through the year specimens may be procured with the under tail-coverts pale yellow or washed with yellow; the birds with the under tail-coverts dull white are more often obtained during winter. These observations were made entirely from birds seen, or specimens obtained, in the neighbourhood of Sydney.

In New South Wales the Silver-eye is freely distributed over the eastern portion of the State, but is far more numerous in the coastal districts. During the autumn and winter months

* Sharpe, Cat. Bds. Brit. Mus., Vol. IX., p. 156 (1884).

† North, Rec. Aust. Mus., Vol. II., p. 98 (1896).

it moves about in flocks from about ten to fifty or a hundred or more in number, usually resorting to sapling scrubs, undergrowth, shrubberies, or gardens. At this time of the year it generally utters a peevish kind of call-note, which is also often emitted during flight. In spring the notes are low, clear, decidedly musical, and long sustained.

The normal food of this species consists of insects and small wild fruits and berries. It is very fond of the introduced Ink-weed or Dye-berry (*Phytolacca octandra*) and may sometimes be seen pecking at the berries of the Pepper-tree (*Schinus molle*). It is a great pest in orchards and vineyards, eating all kinds of soft fruits, such as cherries, plums, mulberries, peaches, apricots, figs, etc. Opinion is divided whether the amount of injurious insects consumed does not compensate for the harm it does to the fruit crops. There is no question about the vast amount of good it does in ridding fruit trees, roses, fuchsias, and other plants of aphides, as I have frequently seen it do, more especially in July and August. This, however, could be done as effectually by means of a wash or spray at a fraction of the value of the fruit it destroys in the season. Viewed from different standpoints, a florist would probably regard it as a very useful little bird, but an orchardist or vigneron just the reverse, for the Silver-eye demands a very heavy tax from both of them for any benefits it may have conferred. Comparative with its size it is one of the worst bird pests, vignerons in particular, have to contend with. It is the quiet and unobtrusive manner in which it goes to work that renders precautionary measures other than enclosing every vine or tree with small meshed netting absolutely useless; its colour also assimilating so closely to its surroundings, especially when feeding among the light varieties of grapes as to render detection almost impossible. The Silver-eye is an early riser commencing its depredations at the first blush of morn and continuing them with unabated vigour throughout the greater part of the day, and is undeterred with one watching only a few feet away. It is not so much the quantity of grapes eaten, as it is the number of bunches with a grape here and there pierced by the bill of the Silver-eye and destroyed, and which have to be carefully gone over and cut out, especially in the more choice kinds grown for the table.

The nest is a neat round cup-shaped structure, externally formed of fine dried grasses and bark, held together with a thin covering of spiders' web, and lined inside with fine dried grasses or fibrous rootlets, and horsehair. Some nests are largely composed of *Casuarina* leaves, others are thinly coated with fine green mosses, or with spider's web and egg-bags. An average nest measures externally three inches in diameter by one inch and three-quarters in depth, the inner cup measuring two inches in diameter by one inch and a half in depth. It is attached at the rim to a thin forked horizontal twig of any suitable tree, usually a *Melaleuca*, *Leptospermum* or *Syncarpia*, in the neighbourhood of Sydney, and occasionally a gum sapling. About orchards and gardens they are often built in fruit trees and shrubs. The nests are generally placed within hand reach, but the height varies from three to twelve or fourteen feet from the ground.

The eggs are usually three, sometimes four in number for a sitting, oval in form, the shell being close-grained, smooth, and slightly lustrous. They are of a uniform pale blue, and are richer in colour when fresh and directly they have been emptied of their contents. This intensity of colour is lost, however, as soon as the shells are perfectly dry. A set of four in the Australian Museum collection, taken at Randwick, New South Wales, on the 29th September, 1892, measures:—Length (A) 0.67 × 0.5 inches; (B) 0.67 × 0.5 inches; (C) 0.62 × 0.5 inches; (D) 0.63 × 0.49 inches. A set of three taken at Roseville, on the 5th September, 1904, measures:—Length (A) 0.63 × 0.47 inches; (B) 0.65 × 0.46 inches; (C) 0.65 × 0.47 inches.

Young birds that have recently left the nest resemble the adults in breeding plumage but are duller in colour, more especially on the throat. Wing 2.15 inches.

The breeding season commences about the middle of August and continues until the end of January. Nests with eggs are more common in October, November, and December; I have found fresh eggs as early as the 5th September, and as late as the 3rd January.

It was in a tea-tree scrub at the mouth of the Yarra River near Melbourne, that I first found the egg of the Rufous-tailed Bronze Cuckoo (*Lamprolaima basalis*) in the nest of this species.

Zosterops vegeta.

YELLOW-VENTED SILVER-EYE.

Zosterops westernensis vegeta, Hartert, Nov. Zool., Vol. VI., p. 425 (1899).

ADULT MALE—*Similar to the breeding plumage of the adult male of Z. LATERALIS, but with paler flanks, and the vent and under tail-coverts bright olive-yellow like the throat; "bill black, basal half of lower mandible horn-colour; legs and feet light brown"* (Smith). Total length 4.2 inches, wing 2.2, tail 1.7, bill 0.4, tarsus 0.63.

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-eastern Queensland.

THE present species is distributed throughout the coastal districts of North-eastern Queensland. Dr. E. Hartert described the type from specimens obtained at Cape York. There are specimens in the Australian Museum collection obtained by Mr. K. Broadbent, Messrs. E. J. Cairn and Robert Grant, and Mr. A. F. Smith in the neighbourhood of Cairns, Queensland.

Whether this species undergoes a seasonal change of plumage like *Z. lateralis*, I am unable to state from the small amount of material in hand. The specimen in which the differences pointed out above occur, was obtained by Mr. A. F. Smith on the 23rd June, 1905, and its plumage is the reverse to that of *Z. lateralis*, of South-eastern Australia at that time of the year. Two more specimens in the collection obtained by Mr. K. Broadbent and Messrs. E. J. Cairn and Robert Grant, are in the same stage of plumage, but the dates they were collected are unknown. In the Bloomfield River District Mr. Frank Hislop informs me that it is found both in the scrub and forest-land, and that its food is insects and small berries. On the label of the specimen sent by Mr. Smith is recorded "food small fruits."

The nest is a small, cup-shaped structure, formed chiefly of cocoa-nut fibre matted together with cobwebs and green mosses, the inside being neatly lined with fine yellowish-brown wiry rootlets. It measures externally two inches and a quarter in diameter by two inches in depth, the inner cup measuring one inch and three-quarters in diameter by one inch and a half in depth.

The eggs are three in number for a sitting, oval in form, the shell being smooth and close-grained and its surface slightly lustrous. They are of a uniform pale greenish-blue and measure:—Length (A) 0.65 × 0.48 inches; (B) 0.62 × 0.47 inches; (C) 0.62 × 0.45 inches.

Zosterops gouldi.

GREEN-BACKED SILVER-EYE.

Zosterops chloronotus, Gould, Proc. Zool. Soc., 1840, p. 165; *id.*, Bds. Austr., fol., Vol. IV., pl. 82 (1848).

Zosterops gouldi, Bonap., Consp. Av., Tom. I., p. 398 (1850); Gould, Handbk. Bds. Austr., Vol. I., p. 588 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. IX., p. 162 (1884).

ADULT MALE—*General colour above olive-green, slightly brighter on the rump and upper tail-coverts; upper wing-coverts like the back; quills and tail feathers dusky-brown, externally edged with bright olive-green; around the eye a ring of silvery-white feathers, which is broken on the anterior portion by a small black spot in front of the eye, a blackish wash also extending to the feathers below the white eye-circlet; chin and throat yellow, slightly tinged with olive; fore neck and upper breast ashy grey; lower breast and flanks grey, washed with pale brown, the centre of the abdomen dull*

white, tinged with yellow; under tail-coverts yellow. Total length 4.25 inches, wing 2.2, tail 1.8, bill 0.38, tarsus 0.68.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Western Australia.

GOULD originally described the Green-backed, or Western Silver-eye, which is confined to the south-western portions of the continent, in the "Proceedings of the Zoological Society" in 1840, under the name of *Zosterops chloronotus*. The latter distinctive appellation being preoccupied by Vieillot in 1817 for a species inhabiting Mauritius, in 1850 Bonaparte dedicated the present species to Gould.

On the under surface *Z. gouldi* more closely resembles *Z. vegeta*, but from that species it may be easily distinguished by its uniform olive-green upper parts. In the Australian Museum collection are specimens procured by Mr. George Masters in 1868-9 at King George's Sound. An adult male obtained on the 24th March, 1869, has the flanks of a distinctly darker shade of brown than others procured in September and November 1868. That the present species is equally destructive to cultivated fruits as its eastern congener *Z. lateralis*, is shown by its local names of Grape- and Fig-eater, applied to it by the early colonists of the Swan River District. Gould adds further testimony to its fruit-eating proclivities in his "Handbook to the Birds of Australia,"* where he writes:—"Zosterops gouldi constitutes a beautiful representative of the *Z. caeruleus* of the southern and eastern coasts. As might be supposed, the habits, manners, actions, and economy of two species so nearly allied are very similar; hence the settlers of Swan River were not long in discovering that they had found no friends to their gardens during the season when the fruits are ripening, whatever good it may effect by the destruction of insects at other periods. Gilbert informed me that "this bird is particularly fond of figs and grapes, it consequently abounds in all the gardens where these plants are cultivated; and it is often to be seen as numerous as sparrows in England. The breeding season commences in August and ends in November; those nests that came under my observation during the earlier part of the season, invariably contained two eggs, but in October and November I usually found the number to be increased to three, and upon one occasion to four. The nest is small, compact, and formed of dried wiry grasses, bound together with the hairy tendrils of small plants and wool, the inside being lined with very minute fibrous roots; its breadth is about two inches, and depth one inch. The eggs are greenish-blue, without spots or markings, eight lines long by six lines broad."

Zosterops albiventer.

PALE-BREASTED SILVER-EYE.

Zosterops à ventre blanc, Homb. et Jacq., Voy. Pôle Sud, Atlas pl. 19, fig. 3 (1844).

Zosterops albiventris, Reichb., Handbk. Merop. p. 92, Taf. 461, fig. 3298 (1852); Jacq. et Pucheran, Voy. Pôle Sud, Zool., Tom III., p. 95 (1853); Salvad., Orn. Pap. et Molucc. Pt. ii., p. 366 (1881).

Zosterops flavogularis, Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 56 (1876); North, Proc. Linn. Soc. N.S.W., 2nd ser., Vol. II., p. 408 (1887).

Zosterops albiventer, Sharpe, Cat. Bds. Brit. Mus., Vol. IX., p. 164 (1884).

ADULT MALE—General colour above olive-yellow, of a clearer yellow on the upper tail-coverts; upper wing-coverts like the back; quills brown, externally margined with olive-yellow, more broadly on the innermost secondaries, the apical portion of the outermost primaries narrowly edged with ashy-brown; tail-feathers brown externally edged with yellow; head olive-yellow; a ring of feathers around the

* Gould, Handbk. Bds. Austr., Vol. I., p. 589 (1865).

eye silvery-white; a small spot in front and feathers below the white eye-circlet blackish; ear-coverts olive-yellow; base of forehead, chin, cheeks, throat, and fore neck bright yellow; upper breast pale ashy; remainder of the under surface pale creamy-white, tinged with isabelline on the flanks, a line of feathers down the centre of the breast washed with yellow; under tail-coverts bright yellow; "upper mandible black, the lower mandible black at the tip lighter at the base; legs and feet bluish-grey; iris dark brown" (Masters) Total length 4.45 inches, wing 2.2, tail 1.7, bill 0.42, tarsus 0.7.

ADULT FEMALE—Similar in plumage to the male but with slightly paler flanks.

Distribution—Cape Grenville, North-eastern Queensland; Islands of Torres Strait.

IN describing this species, in the text of the "Voyage au Pôle Sud,"* MM. Jacquinot and Pucheran state that the type was obtained on Warrior Island. Later on Mr. George Masters, the Curator of the Macleay Museum, at the University of Sydney, described it under the name of *Zosterops flavogularis*,† from specimens obtained by the members of the "Chevert" Expedition, fitted out by the late Sir William Macleay in 1875. Following his description Mr. Masters there remarks:—"One male and one female collected at Cape Grenville, (North-eastern Queensland), five males and three females Sue Island, one female Bet Island, one female Warrior Island, and one male Darnley Island. It is common at Cape Grenville and throughout all the wooded islands in Torres Strait." In the "Catalogue of Birds in the British Museum,"‡ Dr. R. B. Sharpe enumerates specimens from Eagle, Booby, Murray and West Islands.

The above description is taken from an adult male in the Australian Museum collection, obtained by Mr. Masters on Sue Island, on the 27th July, 1875. The wing-measurement is slightly smaller than the one described by Mr. Masters in the "Proceedings of the Linnean Society of New South Wales," the latter being 2.3 inches, that of the specimen described by Dr. Sharpe in the "Catalogue of Birds in the British Museum" being 2.45 inches.

There is a nest in the Macleay Museum, taken on the 27th June, 1875, by Mr. Masters, on Warrior Island, the same locality as the type of this species was obtained. It is a deep cup-shaped structure, composed of dried skeletons of leaves, held together with spiders' webs, and neatly lined inside with fine wiry grasses, the whole exterior being covered with broad thin strips of perfectly white semi-transparent paper-like bark of a *Melaleuca*. Externally it measures three inches and one-eighth in diameter by two inches in depth, the inner cup measuring one inch and three-quarters in diameter by one inch and a half in depth. The nest was attached by the rim to a thin forked horizontal branch of a shrub, about five feet from the ground. It contained two fresh eggs of a uniform pale bluish-green, and the measurements of both are alike:—Length 0.72 × 0.5 inches.

Family DICÆIDÆ.

Genus DICÆUM, Curvier.

Dicæum hirundinaceum.

MISTLETOE-BIRD.

Motacilla hirundinacea, Shaw, Nat. Misc., Vol. IV., pp. prec. and opp. to Pl. 114 (1792).

Dicæum hirundinaceum, Gould, Bds. Austr., fol., Vol. II., pl. 34 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 581 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 19 (1885).

ADULT MALE—Head, all the upper parts and tail glossy steel-blue; upper wing-coverts and innermost secondaries like the back; remainder of the quills black, narrowly edged externally with

* Voy. Pôle Sud., Tom III., p. 95. (1853).

† Proc. Linn. Soc. N. S. Wales, Vol. I., p. 56 (1876).

‡ Sharpe, Cat. Bds. Brit. Mus., Vol. IX., p. 165 (1884).

steel-blue; lores, cheeks, and sides of the neck black; ear-coverts like the crown of the head, but not so glossy; chin, throat, and fore neck scarlet; breast dull white with a broad black streak down the centre, some of the feathers glossed with steel-blue, as are also a few on the sides of the chest; sides of breast and flanks ashy, the former having a dusky wash; under tail-coverts scarlet; bill black; legs and feet black; iris black. Total length in the flesh 4.5 inches, wing 2.5, tail 1.5, bill 0.3, tarsus 0.5.

ADULT FEMALE—General colour above dark ashy-brown, slightly glossed with steel blue on the lower back and rump; wings similar but having more of a bluish-green gloss, and becoming brighter on the apical portion of the innermost secondaries; upper tail-coverts glossy steel-blue with dull black bases; tail feathers black with a faint steel-blue gloss; head, cheeks, and sides of the neck like the upper back; all the under surface creamy-white, the fore neck, upper breast and flanks ashy; vent and under tail-coverts pale scarlet.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia.

THE range of the Swallow *Dicæum*, or Mistletoe-bird as it is more frequently called, extends to all parts of the Australian continent. It is common in the rich brushes and open forest lands near the coast, also on the highest timbered peaks of our mountain ranges, and in the trees bordering the creeks and rivers of Central Australia. Especially it is to be found where the *Loranthus* and other parasitical plants flourish. In fact wherever the Swallow *Dicæum* is found, if the *Loranthus* is not there it will most assuredly follow. Much has been written upon the distribution of the *Loranthus* by means of this little bird feeding upon its berries. On the 26th December, 1893, at Canterbury, New South Wales, my attention was attracted by the actions of a male *Dicæum* in a low *Casuarina*. While perched on a horizontal branch it was making a tremulous motion of its wings. Some few minutes after it voided several berries of *Loranthus*, held together in a "string" only by their own viscid and glutinous covering. As the bird flew away, the upper portion of this pendant mass came in contact and remained attached to the branch on which the bird had been perched.

The late Mr. K. H. Bennett writing from the Mossgiel District, New South Wales, in 1886, remarks:—" *Dicæum hirundinaceum* is tolerably numerous in the timbered or scrubby portions of this locality. It is here entirely frugivorous, its food consisting exclusively of the berries of the *Loranthus* and other parasitic plants which are here extremely varied. The food is passed through the bird, and is in exactly the same state as when swallowed. I have seen numerous instances where the seed of the berry has germinated and grown on the branches of various trees. At Yandembah Station, some twenty years ago, I planted at each end of the verandah, some *Casuarina* raised from seed I had brought from a distant part of the colony. These trees grew wonderfully well and in time afforded a dense shade. Some short distance off was a clump of indigenous trees, thickly grown over with a parasitical plant which was a favourite resort of these birds. During the hotter part of the day the birds would seek the dense shade of the *Casuarina* near the house, and the trees were soon sprinkled over with the viscid berries, numbers of which germinated and the trees are now a dense mass of this parasite. Previous to the birds resorting to them there was no such plant on them."

Writing from Broken Hill, South-western New South Wales, Dr. W. Macgillivray sends me the following notes:—"Only occasionally have I seen *Dicæum hirundinaceum* in the fruiting mistletoe, which is here usually parasitic on various species of Acacia, and its fruit is not capsule. This fruit often shrivels, becomes very sticky, and sprouts on the parent plant, and if growing high up, it may when it drops off stick to another branch and grow. When in this sprouting sticky condition it could easily cling to the plumage of any bird and be carried from tree to tree. In Queensland, when a boy, I was much interested in the question as to whether this plant depended solely upon the *Dicæum* for its dispersal, and could easily make observations as the trees were low, mistletoe abundant, and *Dicæum* very common. I came to the conclusion

that the berries formed its sole food, and that this bird was the chief agent in the dispersal of the plant, as I often found the berries sprouting where they had been passed by the bird. However they did not require to pass through the bird to ensure their sprouting, as several that I plastered on to branches grew quite as well as those dropped by *Dicaeum*."

Mr. Frank Hislop writes me:—"The Swallow *Dicaeum* is very common in the Bloomfield River District, North-eastern Queensland, and are very fond of the berries of the mistletoe. I have noticed on a Wattle tree where these birds have been feeding their young, that the seeds which they have passed are stuck on the branches and would germinate after the

first week if rain comes on. The small domed nest of this bird is made of cobweb and the fluff off the Bottle-brush cone. I found one with two fresh eggs, in a She-oak tree growing on the sea-beach about fifteen yards from the water."



NEST OF MISTLETOE-BIRD.

at the back near the top to a thin slanting leafy branch, the leaves of which usually more or less conceal the structure, and is built at a height varying from two and a half to forty feet from the ground. Little or no preference is shown for any particular kind of tree, gums, wattles, and swamp oaks are from their being so common in the neighbourhood of Sydney, more often resorted to, but any scrub or brush tree is also utilized. Some nests are more oval in form than the one here figured.

I received a nest, with the parent birds shot close by on the 11th January, 1891, together with a set of three eggs, from Mr. W. J. Grime, of the Tweed River, New South Wales, who informed me that he had the nest, which was built in a tree near his house, under observation since it was commenced, and that eleven days elapsed before it was completed and ready for eggs.

The nest is a small pear-shaped structure with a comparatively large entrance on one side near the top, where it is much thicker than at the back, it is usually composed of plant down with a slight addition of cobwebs, and is beautifully woven together, closely resembling felt. Dull white or brownish-white is the prevailing hue of the nests, except when built in mountain ranges and coastal brushes, when the red downy covering of the freshly budded fronds of the ferns is often utilized. The nest figured, taken by Dr. W. A. Angove, at Tea-tree Gully, South Australia, on the 13th October, 1906, differs in form from any I have seen, in having a strengthening piece of rounded nesting material two inches and a quarter in length and half an inch in thickness running from the branch to which the nest is attached all down the back of the structure. An average nest measures three inches and a quarter in length, its greatest diameter two inches and a quarter, the aperture which is pear-shaped, measuring one inch and a quarter in length by one inch in width. It is firmly attached

Mr. E. H. Lane and Mr. Leslie Oakes, on Wambangalang Station, near Dubbo, found between the 17th October and 30th November, 1892, no less than thirteen nests, with eggs or young; all were built in saplings or stringy-bark trees at a height varying from five to fifteen feet from the ground. A nest from which three fresh eggs were taken on the 14th November, 1897, at Pennant Hills, was brought me for examination. It was built in a leafy branch of an apricot tree, at a height of five feet from the ground. A nest found at Eastwood, by Mr. S. W. Moore, on the 26th December, 1893, he attempted but could not get at a week later, for it was built in the thin terminal leafy twigs of a Eucalyptus, fully forty feet from the ground. One I found on the 17th March, 1894, at Enfield, which the young had apparently just left, was built in a stunted gum sapling close to the roadside, and six feet from the ground. At Bayview, on the Hawkesbury River, Mr. A. E. Ivatt informed me that he saw a bird engaged in the construction of a nest near the roadside on the 2nd January, 1899. Writing me in 1906, Mr. E. H. Lane remarks:—"In 1900 I found four nests of *Dicæum hirundinaceum* at Wambangalang Station, near Dubbo, during October, and one on the 4th November. To two found on the 23rd October, I saw the birds carrying what I took to be lining material so left them. On examining them a week later I found each containing three eggs within a day or two of hatching. Either one bird was feeding the other on the nest, or like I have seen the Red-capped Robin, was doing a little finishing work; I believe the latter, judging from the appearance of the material carried and the bird entering the nest, which would not be necessary for feeding purposes. I mention these incidents for the actions of the birds caused me to lose two sets of eggs. One nest was only two and a half feet from the ground, but so certain was I that the bird was only lining or finishing it off that I did not go within some yards, fearing the birds would desert it. All the nests I have taken have been in saplings or stringy-bark trees, gums or white-box, and have ranged in height from two and a half to thirty feet from the ground."

The eggs are three in number for a sitting, elongate-oval in form, pure white, the shell being close-grained, smooth and lustreless. A set of three in the Australian Museum collection, taken at Ballina, Richmond River, in October, 1892, measures as follows:—Length (A) 0·66 × 0·47 inches; (B) 0·66 × 0·47 inches; (C) 0·66 × 0·46 inches. A set of three taken by Mr. Leslie Oakes on Wambangalang Station, near Dubbo, New South Wales, measures:—Length (A) 0·7 × 0·46 inches; (B) 0·69 × 0·45 inches; (C) 0·7 × 0·46 inches.

Young males resemble the adult female. Semi-adult males exhibit the plumage of both sexes, the ashy-brown feathers of the head and upper parts being mottled with glossy-steel blue feathers, some of the feathers on the throat and fore neck being scarlet, and the under tail-coverts pale scarlet. The wing-measurement of a specimen in the Australian Museum in this stage of plumage is 2·4 inches, and exceeds that of any fully adult bird in the collection.

September until the end of February constitutes the normal breeding season of this species in Eastern Australia.

Family PARDALOTIDÆ.

Genus PARDALOTUS, Vieillot.

Pardalotus ornatus.

STRIATED DIAMOND-BIRD.

Pardalotus ornatus, Temm., Pl. Col., Tou. IV., pl. 394, fig. 1 (1826); Sharpe, Cat. Bds. Brit. Mus., Vol. X, p. 55 (1885).

Pardalotus striatus, Gould, Bds. Austr., fol., Vol. IV., pl. 38 (1848); *id.*, Handbk. Bds. Aust., Vol. I., p. 161 (1865).

ADULT MALE.—General colour above olive-grey passing into a fulvous-brown on the lower back, rump, and upper tail-coverts, the outer scapulars also being washed with fulvous-brown; upper wing-coverts black; spurious wing black, its inner edge white; primary-coverts black tipped with scarlet; quills blackish-brown narrowly edged with white at the tip and which extends around the apical portion of the outer web of the innermost secondaries, the basal portion margined with chestnut-brown, which is more conspicuous in some specimens than others, the second to sixth primary white at the basal portion of the outer web increasing in extent along the web, but decreasing in width towards the outermost primary, which has the entire outer web almost imperceptibly edged with white, when the wing is closed a very distinct white patch is formed at the base of these primaries; tail feathers black with a spot of white at the tip of the inner web, which is larger on the outermost one on either side; crown of the head black the feathers on the occiput and nape distinctly streaked with white, more broadly at the tip; lores blackish; a broad streak extends from the nostril on to the sides of the nape, the anterior portion being rich yellow, and that above and behind the eye white; ear-coverts black, streaked with white; cheeks white; centre of throat and fore neck yellow; centre of breast and abdomen white; sides of body and under tail-coverts very pale fulvous-brown, the sides of the breast separated from the white centre by an ill-defined line of pale olive-yellow; bill black; legs and feet fleshy-brown; iris rich brown. Total length in the flesh 4.2 inches, wing 2.6, tail 1.35, bill 0.27, tarsus 0.75.

ADULT FEMALE.—Similar in plumage to the male.

Distribution.—New South Wales, Victoria, South Australia, Central Australia, Western Australia.



STRIATED DIAMOND-BIRD.

OVER the southern portions of the Australian continent the present species is freely distributed, being found in New South Wales, Victoria, South, Central, and Western Australia. In the collection of the Australian Museum are specimens obtained by Mr. George Masters at Mongup, Salt River, and King George's Sound, Western Australia; also from various collectors around Adelaide, Port Augusta, and other parts of South Australia. From Central and Western New South Wales are specimens procured by the late Mr. K. H. Bennett on the Lachlan River, and by Dr. E. P. Ramsay and myself on the Bell River, Wellington, and the Macquarie River, Dubbo. I have also received for examination from the South Australian Museum, Adelaide, specimens obtained at the Gawler Ranges, and by Dr. A. M. Morgan, at Laura and Donald's Plain, South Australia, and an adult male from Mildura, Victoria. Mr. Edwin Ashby has also kindly lent me specimens procured by him at Perth and Callion, Western Australia, and from Nackara, Sandy Point, and Mount Barker, South Australia. It haunts alike stunted vegetation and the lofty *Eucalypti*, among the leaves of which it obtains its food consisting principally of insects. It is a tame and fearless species, and I have stood only a few feet away listening to the sharp snap of its bill while feasting upon the eggs of one of the wood-feeding moths.

Writing from Adelaide, South Australia, Dr. A. M. Morgan sends me the following notes:—“*Pardalotus ornatus* is the commonest species of the genus in this State, and I have met with it in every part visited. They breed from August to December, generally in the hollow limb of a tree, but once at Yardea, in the Gawler Ranges, I found a pair building in an old nest of a Fairy Martin, built on the ceiling of a deserted hut. On 12th August, 1902, I saw a pair forming a nest in a crack between the stones of a house at Yardea, and three days later I saw another pair

picking out the mortar between the stones of the head station at Tharalga, probably for the same purpose. The eggs are almost invariably four in number."

Mr. Edwin Ashby, writing from Blackwood, remarks:—"Pardalotus ornatus is common here and almost everywhere in South Australia, and I send you specimens from widely separated localities and different kinds of country. I have only found their nests here in thatched roofs, they burrow into the eaves like a mouse."

Mr. W. W. White of the Reed-beds near Adelaide, sent me a note that *Pardalotus ornatus* used to be very common in the red-gum trees around his house, but the introduced House Sparrow had driven many of them out of their nesting-places. In July 1893 he picked up nine adult birds apparently killed by the cold weather after being ousted from their haunts. Since the decrease in numbers of these birds the gum-tree blight has increased to a great extent.

Mr. E. H. Lane of Wambangalang Station, near Dubbo, New South Wales, writes me:—"In my early boyhood's days at Orton Park, near Bathurst, the favourite nesting-place of *Pardalotus ornatus* was in the nest of the Fairy Martin, from which I have known them to eject the young of the latter and take possession and build their own nests. I have also known them to burrow into the mortar of badly formed stone walls and build their nests between the roughly placed stones. Also to nest in the hollow limbs of trees and at the end of a tunnel in banks and cuttings." In the Australian Museum collection there is a skin of an adult male collected by Dr. Ramsay, labelled "Cardington, Bell River, New South Wales, found breeding in the nest of *Lagenoplastes arid*, November, 1860."

On Wattagoona Station near Louth, in Western New South Wales, Mr. James Ramsay and Mr. Edward Lord Ramsay found the nests of this species built in various sites. About buildings these birds often took possession of the nest of the Fairy Martin, and on one occasion constructed their nest between the ceiling and the roof. Another pair worked assiduously at the mortar in a crevice of the stone work, but finally had to abandon it, in fact any situation is utilized by this bird where it is possible to construct its nest under cover. In the paddocks Mr. E. L. Ramsay obtained them usually in the hollow limbs of trees, and on several occasions found them breeding in company with *Cheramacca leucosternum* in a hole in the side of a bank or creek; they prefer, however, to make a tunnel where the earth is harder than the site usually chosen by the White-breasted Swallow for its nest. When resorting to the bank of a creek, Mr. Ramsay informs me the nest is cup-shaped with a short spout, and is composed entirely of wiry rootlets and grasses, neither bark nor feathers being used, as when built in the hollow limb of a tree.

While resident in the Western District, Victoria, Dr. W. Macgillivray kindly sent me the following notes:—"Pardalotus ornatus is common amongst the gums in all parts of the Hamilton District. They nest from September until the end of November, and choose either a tree or the bank of a creek or gully for the purpose, they are fond of building close to one another, several nests, six or seven I have noticed, being within a radius of twenty or thirty yards, and the same locality is resorted to year after year. The burrow, whether in a bank or in the softened centre of a tree, is usually rounder than that of the Spotted Diamond-bird, and the nest is not so well made as that of the latter bird, the foundation usually being a compact mass of rootlets and fine grass, but very scantily roofed in. The Pardalotes are very local in their habits and tend to form local races or phases differing usually in the shade of the coloured speculum and in the amount and extent of the white on the primaries."

The eggs are usually four in number for a sitting, oval or rounded-oval in form, pure white, the shell being close-grained smooth and slightly lustrous. A set of four measure:—Length (A) 0.78 × 0.55 inches; (B) 0.79 × 0.56 inches; (C) 0.75 × 0.53 inches; (D) 0.79 × 0.55 inches.

Young birds that have just left the nest have the forehead and crown of the head olive-grey like the back, and there is only a slight indication of a fulvous wash on the upper tail-coverts, there is no sign of the broad superciliary streak, and the cheeks and under surface are dull white uniformly washed with yellow. Wing 2·2 inches. A further progress towards maturity is exhibited in some specimens in the feathers on the occiput being black, streaked with white, the yellow streak behind the nostril is well defined, and to a less extent the continuing dull white line above and behind the eye; on the under parts the yellow centre to the throat and streak on each side of the breast is more clearly indicated. Wing 2·4 inches.

August and the four following months constitute the usual breeding season of this species, nests with eggs being more frequently found in New South Wales during September and October.

Pardalotus assimilis.

RAMSAY'S DIAMOND-BIRD.

Pardalotus assimilis, Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 180 (1878); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 56 (1885) (subsp.).

ADULT MALE—*Like the adult male of PARDALOTUS ORNATUS*, Temminck, but having the upper parts of a clearer grey, and the rump and upper tail-coverts much paler, the primary-coverts are usually tipped with orange-red and the outer web of the third primary only is, as a rule, distinctly margined with white, as in *P. AFFINIS*. Total length in the flesh 4·3 inches, wing 2·55, tail 1·3, bill 0·3, tarsus 0·75.

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, Victoria.

OF the striped-crowned members of the genus *Pardalotus* the present species is the commonest inhabiting New South Wales, its range extending to Queensland and Victoria, and probably it occurs in the adjacent parts of South Australia, but I have never seen a specimen from that State. Of twenty-seven adult specimens now before me, collected in different parts of New South Wales the distinguishing characters pointed out by Dr. Ramsay are constant in twenty-two of them, five only having the outer web of the third as well as the second primary margined with white. I do not refer at all to the very narrow white edge to the outer web of the first primary which is common to nearly every species of the genus. Dr. R. B. Sharpe* points out that the colour of the tips of the primary-coverts or "speculum varies from yellow to orange and to scarlet and even crimson. This question can only be settled by observers in Australia; but it seems to me by no means improbable that *P. striatus* and *P. affinis* interbreed, especially if the localities of all the specimens in the British Museum are to be relied on."

Pardalotus affinis is the only species I have seen with yellow tips to the primary-coverts. In the Australian Museum series of specimens of *P. assimilis*, the tips of the primary-coverts vary in colour from orange to red and crimson. *Pardalotus assimilis* is not the young of *P. ornatus*, or the result of interbreeding between *P. ornatus* and *P. affinis*, nor is it a phase of the latter species, as has been stated, for it does not occur in Tasmania where *P. affinis* is the sole representative of the striped-crowned members of the genus. Moreover *P. assimilis* is not found in Western Australia its place being there taken by *P. ornatus*. In New South Wales *Pardalotus assimilis* chiefly frequents and is a common species in the coastal districts, where *P. affinis* is comparatively rare and *P. ornatus* does not occur. Gould's statement that the young of the latter species "assume the adult colouring from the nest but have the tips of the spurious wing orange instead of red,"†

* Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 56 (1885).

† Gould, Handbk. Bds. Austr., Vol. I., p. 162 (1865).

is incorrect. It is difficult also to reconcile it with his remarks in the succeeding paragraph where he states that he has "positive evidence that some of the Australian species reproduce their kind before they have attained their adult livery." I have never yet seen or heard of an instance, which Gould refers to, in the genus *Pardalotus*.

New South Wales is the stronghold of *Pardalotus assimilis*. It is common in the coastal districts, in the western suburbs of Sydney, on the Blue Mountains, and also occurs in more limited numbers in the forest lands beyond them at Wellington and Dubbo. In these localities numerous specimens have been obtained by Dr. E. P. Ramsay, Mr. J. A. Thorpe and myself. At one time I regarded the species frequenting the neighbourhood of Sydney as *Pardalotus ornatus*, the latter, however, I have not seen on the coastal side of the Blue Mountains, but apparently it occurs as far east as the neighbourhood of Bathurst. From Queensland there is but a single specimen in the Australian Museum collection, a semi-adult female procured at Port Denison in June 1864.

For the purpose of breeding it tunnels a hole in the side of a bank, forming at the end an enlarged chamber where a domed or partially domed-shaped nest is built, principally of strips and shreds of bark. The tunnel is of varying length, at Seven Hills and Rooty Hill they averaged from fifteen to eighteen inches in length, but one I found formed in the soft sandy soil of a bank on the roadside at La Perouse containing young, was only seven inches in length. At Blacktown I noted this species building in the narrow openings left in the brickwork at the railway station. Two birds procured on the same day close by, were obtained while tunnelling holes in a bank, and had the apical half of their bills coated with earth.

Mr. E. H. Lane writes me:—"The only properly authenticated nest of *Pardalotus assimilis* taken by me, the birds of which I shot and sent you, was found on Wambangalang Station. Two more nests believed to belong to this species were taken on the 17th October, 1899, one on the 3rd October, 1901, and another on the 20th November of the same year. All were built at the end of tunnels from eighteen to two feet in length, in the bank of a creek, and each nest contained four white eggs."

Mr. G. A. Keartland sends me the following note:—"On several occasions I found *Pardalotus assimilis* in the red gum trees at Beaconsfield, Clayton, and Heidelberg, Victoria. During a visit to Phillip Island, Western Port Bay, Mr. J. Gabriel secured several sets of eggs from holes in the bank of a creek, capturing one of the parent birds on the nest in one of the burrows."

The eggs are usually four in number for a sitting rounded-oval or oval in form, pure white, the shell being close-grained, smooth, and slightly lustrous. A set of four taken at Blacktown, on 27th September, 1899, measures:—Length (A) 0.75 × 0.58 inches; (B) 0.72 × 0.55 inches; (C) 0.76 × 0.56 inches; (D) 0.71 × 0.57 inches.

With the exception of the differences pointed out in this species, the young and semi-adult birds differ from the adults in precisely the same manner as do those of *Pardalotus ornatus*. In some young and semi-adult specimens the wing speculum is as large and brilliant as is in the adult.

August and the four following months constitute the usual breeding season of this species. West of Sydney, between Parramatta and Penrith, nests with eggs are more often found in September.

Pardalotus affinis.

ALLIED DIAMOND-BIRD.

Pardalotus affinis, Gould, Proc. Zool. Soc., 1837, p. 25; *id.*, Bds. Austr., fol., Vol. II., pl. 39 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 163 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 57 (1885).

ADULT MALE—General colour above olive-grey passing into a pale buffy-brown, tinged with olive on the lower back, rump and upper tail-coverts; upper wing-coverts black, the lesser and median series tipped with pale buffy-brown; primary coverts black tipped with yellow; quills black tipped with white, the innermost secondaries margined on the basal portion of their outer webs with rufous-brown, which passes into white towards the tips, the first primary very narrowly edged with white on the outer web; the third primary distinctly margined with white along the outer web except near the tip; tail feathers black, all except the central pair with a white spot at the tip of the inner web, increasing in size towards the outermost, which has the remainder of the feather brownish-black; lores blackish; a broad streak extends from the nostril to the sides of the nape, the anterior portion being rich yellow, and that above and behind the eye dull white; forehead black; crown of head and nape black with a white streak down the centre of the feathers; ear-coverts and small feathers below the eye blackish, conspicuously contrasted with dull white; cheeks ashy white; throat and centre of fore neck yellow, the sides of the latter pale ashy-brown; centre of the breast and abdomen dull white, separated from the pale buffy-brown sides of the body by an ill-defined broad streak of dull yellow slightly tinged with olive; under tail-coverts pale buff; bill black; legs and feet brown; iris black. Total length in the flesh 4.5 inches, wing 2.65, tail 1.45, bill 0.3, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Southern Queensland, New South Wales, Victoria, Tasmania, and some of the larger islands of Bass Strait.

THE Allied Diamond-bird is abundantly distributed in Tasmania and some of the larger islands of Bass Strait. It also occurs in Victoria, New South Wales, and Southern Queensland. In the Australian Museum collection there are numerous skins of this species obtained by Mr. George Masters and Mr. K. Broadbent in different parts of Tasmania, a few obtained in the neighbourhood of Sydney and other parts of New South Wales, and a skin of an adult male procured by the late Mr. George Barnard on the Dawson River, Queensland. I have also met with it in different parts of Southern Victoria, where on two occasions I found it nesting in hollow limbs of lofty gum trees. Although this species is widely distributed over Eastern New South Wales and may be obtained in the suburbs of Sydney, it is the rarest of the striped-crowned species of the genus *Pardalotus* inhabiting the State. In habits it closely resembles *Pardalotus assimilis*. At Ashfield I have seen it feeding among the leafy twigs of a gum tree in my garden and only a few feet above my head, at the same time uttering its oft repeated call of "pick-it-up" with a single low sweet note between, which can only be heard when one is close to the bird.

Gould states "The young birds have the tips of the spurious wing orange instead of yellow; and although the whole plumage possesses the same character as that of the adult, the markings are less brilliant and well-defined."² In all the young birds I have examined, some of which had recently left the nest, the crown of the head is uniform in colour with the back, and the tips of the primary coverts are yellow as in the adult. In some specimens, however, the yellow tips to the primary-coverts are very faintly indicated and of small size.

From notes made by Dr. L. Holden in Tasmania, I have extracted the following:—"On the 10th October, 1886, I saw *Pardalotus affinis* entering holes in trees about twenty feet from the ground. With tomahawk and chisel I opened up three of these holes on the 17th November; in each was a nest, but in none, eggs. The nests were about an elbow's length away from the entrance, the passage to each being a mere chink in the rotten wood of the interior, and so narrow that one would think there could not possibly be a nest in the tree. Only one nest seemed nearly complete, and that was a dome-shaped structure formed of narrow strips of inner bark. From this nest I took two fresh eggs on the 8th December, and on examining it again on the

² Gould, Handbk. Bds. Austr., Vol. I., p. 164 (1865).

31st of the same month, it contained four eggs very slightly incubated. On the 23rd November I also cut out a nest of this species from a tree on the neck of Circular Head Peninsula, it was only ten feet from the ground, and was a loosely put together dome-shaped structure, formed of dead grasses and bark, and lined inside with bark; the bird was sitting on four pure white eggs. The nest was scarcely a foot from the entrance, and there was much decayed wood and rotting remains of former nests in the hole. I have also found the nest in a bank behind a rifle butt, and in one of the sides of a gravel pit. The birds will fly close about and call vigorously while you are there, and are sometimes loth to leave the hole at all. They breed from October to January. Eggs very round and large, generally four in number. *Hylochelidon nigricans* disputes possession of holes in which this species is breeding."

From Tasmania, Mr. Malcolm Harrison writes me as follows:—" *Pardalotus affinis* nests freely in holes in Eucalypts, and in the breeding season one can hear in all directions its peculiar notes, resembling the syllable 'willyeu,' pronounced rather quickly. There can



A BREEDING-PLACE OF THE ALLIED DIAMOND-BIRD, IN SOUTHERN TASMANIA.

be no doubt that its general habit is to nest in trees wherever it can find a suitable cavity, and only in two spots have I known of a departure from this custom. One of these localities is a high sandy bank on the side of a river in Southern Tasmania, in which some years ago quite a number of pairs nested, boring holes into the soft sand after the manner of *P. punctatus*. I have generally visited this spot at least once during the breeding season in each year, and it appeared to me that the number of birds decreased with each succeeding year, so that comparatively few pairs now frequent the spot. Having what eggs I required, I did not on these occasions molest them, and as I am not aware of others doing so to any extent, the falling off in numbers cannot be attributed to persecution.

"The second breeding place referred to was in a bank on the side of a tributary of the former river. It was late in December when I observed the birds in the latter locality, and they

were busy feeding their young, giving every opportunity for observation. I was on a fishing excursion at the time with Mr. J. W. Tarleton, and knowing how rarely this bird nested under ground, I resolved to catch one to convince my companion of its identity. This was easily accomplished by watching a bird enter a tunnel and then placing the landing-net over the hole. On leaving the nest it was of course secured and I held it while Mr. Tarleton wrote a full description of it in his pocket-book. There were only four or five pairs, and they bored into the bank at the spot where the alluvial soil rested on a gravel bed about four or five feet above the water. I subsequently cut in as far as one of the nests, exposing the young birds, which I was glad to see the parents after some hesitation continued to feed. The length of the tunnel to the nest chamber appears to vary a good deal in accordance with the difficulties encountered, as those in the bank of the former river were usually fifteen inches and upwards in length, whilst the nest I exposed in the latter locality was not more than six inches from the face of the bank. The eggs are three and sometimes four in number for a sitting, but from my own experience the former is usual.

“The principal breeding months are October and November; all the eggs in my collection were taken in the former month. I have not myself taken eggs from nests in trees, although meeting with the birds nesting in that way on numberless occasions. Mr. A. L. Butler gives the following dates from his notes of four nests taken from trees:—15th, 23rd, 26th September, and 1st November.”

From Hobart, Mr. A. L. Butler sends me the following note:—“The usual position of the nest of *Pardalotus affinis* is in a hollow limb of a gum tree, about eighteen to forty feet from the ground, the entrance to it being through a small hole. The nest is generally domed but sometimes cup-shaped, with a few strips of bark raised over the top, and measures from two inches and a half to three inches and a half in diameter. The eggs are usually three, sometimes four, but not often. To my knowledge for the last fifteen years a colony of these birds has nested in a high bank formed of a sandy clay soil on the side of a river. Some years ago there used to be forty or fifty pairs, but the last time I visited the spot, about three years ago, there were only about fifteen to twenty pairs. The nesting holes were about eighteen to twenty-six inches in length by one inch and a half in diameter, with a chamber four to five inches at the end, the nest not quite filling up the chamber. Out of fourteen holes grubbed out, eight nests examined had three eggs, three had four eggs, and three only two eggs, the latter probably not complete sets.”

The site of a breeding place of this species in the side of a high bank is reproduced from a photograph taken by Mr. Malcolm Harrison.

Mr. E. D. Atkinson writes me:—“Wherever I have been in Tasmania or on the larger islands of Bass Strait I have met with *Pardalotus affinis*. Like many other species it is silent during a great part of the year, its familiar note “pick-it-up” is usually first heard in the early part of September. As a rule it builds its nest in a hole in a tree, but I have taken the eggs on one occasion from a hole in the bank of a road cutting at Circular Head.” Mr. Atkinson also informs me that his brother the Rev. H. D. Atkinson, of Evandale, found three nests of this species built in holes in gum trees at Circular Head, each of which contained four eggs. They were taken respectively on the 3rd December, 1886, the 30th October, and 1st November, 1888.

Mr. E. H. Lane sends me the following note:—“The only set of eggs of *Pardalotus affinis* I have in my collection, the bird of which I shot and sent you, were taken by me at Wambangalang Station, near Dubbo, New South Wales. The nest, which I found on the 30th October, 1901, was built in a hollow limb of a tree and contained four fresh eggs.”

The eggs are usually three or four in number for a sitting, and vary from nearly round to rounded-oval in form; they are pure white, the shell being close-grained, smooth, and slightly lustrous. A set of four measures:—Length (A) 0.75 × 0.6 inches; (B) 0.74 × 0.58 inches; (C) 0.73 × 0.6 inches; (D) 0.75 × 0.59 inches. One egg of a set of four, taken by Dr. L. Holden,

on the 23rd November, 1886, at Circular Head, measures $0\cdot77 \times 0\cdot6$ inches. A set of three in Mr. Malcolm Harrison's collection, taken by him on the 24th October, 1896, in Southern Tasmania, measures:—Length (A) $0\cdot73 \times 0\cdot57$ inches; (B) $0\cdot75 \times 0\cdot55$ inches; (C) $0\cdot77 \times 0\cdot57$ inches.

Young birds that have recently left the nest have the forehead, crown of the head and nape olive-grey like the back; the yellow tips to the primary coverts are smaller, as is also the white spot at the tip of the inner web of the lateral tail feathers; the yellow supra-loral streak is duller in colour and less distinctly defined, as is also the continuing dull white streak above and behind the eye; the ear-coverts and sides of the neck are a very pale buffy-brown with a faint yellowish wash, and the yellow throat and centre of fore neck is much paler than in the adult. Wing $2\cdot5$ inches. A further advance towards maturity is exhibited by two specimens in the Australian Museum collection, which have the feathers on the forehead and crown of the head centred with dull yellowish-white, a few on the nape being blackish narrowly streaked with white; both specimens have the tips of the primary-coverts yellow, and in one specimen they are as large as in the adult. Wing $2\cdot6$ inches.

October and the three following months constitute the usual breeding season of this species.

Pardalotus punctatus.

SPOTTED DIAMOND-BIRD.

Pipra punctata, Shaw, Nat. Miscel., Vol. IV., Pl. 111 (1792).

Pardalotus punctatus, Gould, Bds. Austr., fol., Vol. II., pl. 35 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 157 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 58 (1885).

ADULT MALE—*Forehead and crown of head black with small rounded white spots; hind neck, mantle and back greyish-brown, all the feathers margined with black and having an ochreous-buff spot at the tip, those on the hind neck being smaller and paler; rump chestnut-brown; upper tail-coverts crimson; upper wing-coverts and quills black with a rounded spot of white at their tips, larger on the innermost secondaries, the outer web of the first primary externally edged with white; tail feathers black, most of them with a spot of white at the tip; a broad white stripe extends from the nostril over the eye on to the upper portion of the ear-coverts; cheeks, ear-coverts, and sides of throat ashy-grey narrowly barred with black, sides of fore neck similar but the darker barrings almost obsolete; chin, centre of throat and fore neck rich yellow; remainder of the under surface light fawn-colour, darker on the flanks, paler on the centre of the abdomen; under tail-coverts rich yellow, their bases washed with light chestnut-brown; bill black; legs and feet fleshy-brown; iris black. Total length in the flesh $3\cdot35$ inches, wing $2\cdot3$, tail $1\cdot2$, bill $0\cdot25$, tarsus $0\cdot7$.*

ADULT FEMALE—*Differs from the male in being duller in colour, the spots on the head are yellow instead of white, and the chin, centre of throat and fore neck are dull white with a faint ochreous wash, these parts being rich yellow in the male.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Western Australia, Tasmania.

THEN Eastern and Southern Australia the Spotted Diamond-bird is widely distributed, its range also extending to Tasmania. But little variation occurs in the colour or markings of this species, except in the size of the white spots at the tips of the quills and some of the tail feathers; the spots on the back of some examples are nearly white. Among numerous specimens in the Australian Museum collection are adult examples obtained by Mr. George Masters at the Ouse River, Tasmania, and King George's Sound, Western Australia, and they are precisely similar to others procured by Mr. R. Grant at Boar Pocket, Bellenden Ker Range in North-

eastern Queensland. It is more abundantly distributed in the coastal districts than the inland portions of the States, frequenting both the tall *Eucalypti* and low scrub, where it may be seen threading its way among the drooping leaves, busily engaged in searching for small insects and their larvæ, which constitute its food. Nowhere is it more common than in the neighbourhood of Sydney, breeding freely in the suburbs, and in very hot weather I have seen it drink at a dripping water tap in my garden. Its chief notes resemble a rapidly uttered, "sweet-dick."

Stomachs of these birds examined contained only the remains of small insects.

From Tasmania, Dr. L. Holden sends me the following notes:—"Pardalotus punctatus is common where I live on the banks of the Derwent, and was not uncommon where I used to live on the north-west coast. Its curious piping call of two notes is very familiar. I have closely observed a bird that was calling, and saw that it drew up its hind neck and occiput and depressed its beak to produce the first high note, the second or low note was accompanied by a visible squeezing of the chest behind the sternum. It looked as if the bird got the high note by inspiration, and the low note by expiration. A hole in earth is the site of the nest of this Diamond-bird, but the earth may be almost anywhere, even in an old box for flowers on a window sill. It may be nearly flat or perpendicular earth, it may be sand or a clay as hard as rock, it may be bare or clothed with much herbage, on the wall of a great excavation, or in the side of a narrow orchard trench. I have found the nest in a sand hill just above high water mark. On the 30th November, 1886, I found three nests of *P. punctatus*; one contained young ones, the others four and five eggs respectively, the former were well sat upon, the latter nearly hatched. On the 28th December I found three more nests and might have obtained others. I caught the bird on one which contained five nearly fresh eggs. Another nest had five incubated eggs; the other I did not disturb. This bird builds from September to January, and lays four or five white eggs. It is often very fearless when building and may be seen hovering almost like a butterfly in front of its hole while the observer stands close by. I once heard the note of one which was in its burrow, but only once. It was a male bird and I nearly caught it as it flew out."



SPOTTED DIAMOND-BIRD.

The mode in which the male produces its double note described by Dr. Holden, was also observed by Mr. M. Harrison, Mr. A. L. Butler, and myself while sitting on the roadside at Glenorchy, watching a fine old male uttering its call while perched a few feet away from us on a wire fence.

For the purpose of breeding it digs a tunnel in the side of a bank or stump hole about eighteen inches or two feet in length, forming an enlarged chamber at the end and constructs there a domed-shaped nest of strips of bark, lined at the bottom with a small quantity of grass, and in some with a few feathers. An average nest measures externally three inches and three-quarters in length by three inches in diameter, and across the entrance one inch and a quarter.

The eggs are usually four, sometimes five in number for a sitting, rounded oval in form, pure white, the shell being close-grained, smooth and lustrous. A set of five taken at Roseville, on the 18th August, 1904, measures:—Length (A) 0.6 × 0.51 inches; (B) 0.61 × 0.51 inches; (C) 0.62 × 0.52 inches; (D) 0.63 × 0.51 inches; (E) 0.6 × 0.5 inches.

Young birds resemble the adult female, but are less distinctly marked, and the white spots on the quills which are brown, are much smaller and more irregular in shape. Wing 2.15 inches.

August until the end of December constitute the usual breeding season, and both sexes assist in the construction of the nest. In the neighbourhood of Sydney I have obtained nests with fresh eggs from the 13th August to the 15th December. At Roseville these birds construct their nests close to my house, in mounds of soil regularly raked up underneath the large *Eucalypti* for orchard and garden purposes. Mr. R. Meikle who opened up one of these tunnels and finding the nest had not been laid in after flushing the female from it, covered the tunnel over at the top with thin twigs and sticks and loosely replaced the soil; re-opening it a week later he found the female sitting on four eggs. In company with Mr. C. J. Johnston, we found many nests on the side of a rocky gully at Roseville during September 1898. All the entrances were formed close to large flat stones. On removing the latter we found the tunnel followed close to the stone terminating in a beautifully formed nest with four eggs or young. Examining Diamond-birds nests in this manner is much preferable to digging them out, although they are so common they are seldom interfered with except by bird-nesting boys. In this gully we found that the eggs of this species were eaten by a small lizard (*Egernia whitei*), one being captured while leaving a burrow, which disgorged the yolks of the eggs it had just eaten, the shells of which were found in the tunnel. Curious nesting sites are sometimes selected by these birds. At Ashfield on the 26th August, 1896, I saw a bird enter a tunnel with some bark in its bill in a small mound of earth, left on a well metalled and frequented street close to the railway station. At Chatswood and Roseville, I have seen it nesting in gardens, and on two occasions have known it to form tunnels in the soil of rustic fern baskets, hanging under the verandah of a house in the former instance, and the other suspended from the roof of a bush-house.

Pardalotus xanthopygius.

GOLDEN-RUMPED DIAMOND-BIRD.

Pardalotus xanthopygius, McCoy, *Ann. and Mag. Nat. Hist.*, Ser. 3, Vol. XIX., p. 184 (1867); Gould, *Bds. Austr.*, fol., *Suppl.*, pl. 8 (1869); Sharpe, *Cat. Bds. Brit. Mus.*, Vol. X, p. 59 (1885).

Pardalotus leadbeateri (Ramsay), *Newton, Ibis*, 1867, pp. 255-6.

ADULT MALE—Like the adult male of *PARDALOTUS PUNCTATUS*, Temm., but having the general colour of the upper parts ashy-grey, the spots on the mantle and back dull white, and the rump feathers rich golden-yellow; chin, throat, and under tail-coverts clear golden-yellow, remainder of the under surface creamy or faint buffy-white, sides of the fore neck and body ashy-grey. Total length 3·5 inches wing 2·28, tail 1·2, tarsus 0·7.

ADULT FEMALE—Duller in colour than the male, and more of an ashy-brown hue on the upper parts, the spots on the head are dull yellow, and those on the back faint yellowish-white; all the under surface pale creamy-brown, lighter on the throat, the sides of the neck and body slightly washed with ashy-grey; under tail coverts pale golden yellow.

Distribution—New South Wales, Victoria, South Australia, Western Australia.

THE distinctive characters of the present species were first pointed out by the late Mr. John Leadbeater of the National Museum, Melbourne, to Dr. (then Mr.) E. P. Ramsay, and the late Sir (then Professor) Frederick McCoy. At a meeting of the Zoological Society of London held on the 28th February, 1867, was read a paper by Dr. Ramsay describing it under the name of *Pardalotus leadbeateri*. The March number of "The Annals and Magazine of Natural History" contained a description by Sir Frederick McCoy of the same species, under the name of *Pardalotus xanthopygius*. As the part in which Dr. Ramsay's paper would appear would not be published until the 1st May following, the latter wrote to the secretary in the meantime withdrawing his description and name of *Pardalotus leadbeateri*.

The Golden-rumped Diamond-bird is not so widely distributed as the preceding species, but it may be often found frequenting the same localities. From the former which it greatly resembles in the character and disposition of its markings, it may be chiefly distinguished by the bright golden-yellow feathers of the rump, this part being chestnut-brown in *Pardalotus punctatus*: on the under surface it is also destitute of the chestnut-brown wash to the feathers on the lower part of the throat and at the base of the under tail-coverts. The extremes of its range as represented by specimens in the Australian Museum collection is Mongup, Salt River, Western Australia, where Mr. George Masters obtained an adult male in January 1869, and Lithgow on the Blue Mountains, New South Wales, an adult male in the collection being procured there by Mr. Richard Grant. Another specimen was obtained at the same time, but it was too mutilated to preserve. Lithgow is 3,009 feet above the sea-level, and one of the most humid localities on the Blue Mountains. This is the only occasion I have known this species to occur so far north, its range being almost restricted to the south-western and drier portions of the State. Among specimens in the collection from intermediate localities is an adult male from the junction of the Murray and the Darling Rivers, another with the MS. name "*Pardalotus leadbeateri*, (Ramsay), Murray River, Victoria, 1866," and one received from Mr. A. Zietz, procured by him at Golden Square, near Adelaide. Four specimens obtained in South Australia have been kindly lent for examination by the Trustees of the South Australian Museum, and with them Mr. A. Zietz, the Assistant Director, has sent me the following note:—" *Pardalotus xanthopygius* is fairly numerous in some parts of the Mount Lofty Ranges, near Adelaide, but nests which are situated at the end of a tunnel drilled into the level ground are somewhat scarce now, chiefly owing, I think, to the clearing of the scrub. My son and I have found many of their tunnels scratched up by Bandicoots, which evidently dig for the eggs or young birds."

Two adult males, one obtained at Happy Valley, and the other at Sandy Point, Yorke's Peninsula, South Australia, were received on loan from Mr. Edwin Ashby, of Blackwood, who writes me as follows:—" *Pardalotus xanthopygius* is often seen in my orchard and the birds are very tame, drinking in the reservoir, as also does *P. ornatus*. I have never seen them nesting in the garden, but doubtless they do so close by. At Happy Valley, which is a lower altitude, about four miles away, they choose a spot in the white sandy soil where there is a slight rise, but hardly enough to be called a bank, and there make a tunnel about eighteen inches in length at the end of which they construct a dome-shaped nest of bark."

Dr. A. M. Morgan writes me:—" *Pardalotus xanthopygius*, I have met with as far north as Port Augusta, and in all the country between there and Adelaide. I have found its nests from October to January, and in my experience, the tunnels were always formed in a bank, but have heard of it drilling a hole in the level ground, as the Bee-eaters sometimes do. The eggs are three or four in number, usually four."

Mr. C. J. McLennan writes me:—" *Pardalotus xanthopygius* is common on Pine Plains Station in the Wimmera District, North-western Victoria. Its food consists of insects and scale obtained on the mallee leaves and bark. By imitating their note one can allure them to within a few feet. For breeding purposes a small hole is burrowed in the soil from fifteen inches to two feet in length, at the end of which is a rounded chamber, and here the nest, which is built of narrow strips of bark and bark fibre, is formed. Four eggs is the full complement laid. The usual breeding season is from July to the end of December."

The eggs are four in number for a sitting, rounded oval in form, and occasionally somewhat pointed at the smaller end. They are pure white, the shell being close-grained, smooth, and lustrous. A set of four taken by Mr. C. J. McLennan, on Pine Plains Station, Wimmera District, Victoria, in September 1902, measures:—Length (A) 0.63 × 0.53 inches; (B) 0.65 × 0.54 inches; (C) 0.63 × 0.51 inches; (D) 0.65 × 0.54 inches. A set of four in Mr. G. A. Keartland's collection

measures:—Length (A) 0·65 × 0·52 inches; (B) 0·68 × 0·53 inches; (C) 0·66 × 0·52 inches; (D) 0·63 × 0·52 inches.

As will be seen from the preceding notes, the normal breeding season is during the latter quarter of the year but extends from July to December. While at the South Australian Museum on the 4th December, 1900, I saw an adult male of this species in the flesh, procured by Mr. Zietz at Golden Square, near Adelaide. Mr. Zietz who was in company with his son, informed me that they had discovered the nesting place, and on digging it out found the nest just completed and ready for eggs.

The first eggs I saw of the Golden-rumped Diamond-bird were in the old National Museum, in the grounds of the University of Melbourne. They were taken with the birds, by the late Mr. J. H. Nancarrow, in the Bendigo District, Victoria, in 1868, a year after Sir Frederick McCoy had described the species.

Pardalotus rubricatus.

FAWN-EYEBROWED DIAMOND-BIRD.

Pardalotus rubricatus, Gould, Proc. Zool. Soc., 1837, p. 149; *id.*, Bds. Austr., fol., Vol. II., pl. 36 (1848); *id.*, Handbk. Bds. Austr., Vol. 1., p. 158 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 60 (1885).

ADULT MALE—*General colour above very pale creamy-brown, the feathers on the hind neck with indistinct dusky edges, and those on the back with narrow dusky shaft lines; the upper tail-coverts distinctly washed with yellow; lesser, median, and innermost greater wing-coverts like the back, the latter with whitish margins around the tip, remainder of the greater coverts brown, edged with white around the tip; primary-coverts blackish, broadly margined externally with rich golden-yellow; quills dark brown, externally edged with golden-yellow decreasing in extent on the outermost primaries which are narrowly edged with white except near the base, the secondaries margined with white around the tips, more broadly on the innermost; tail-feathers pale brown becoming blackish-brown towards the tips where they are margined with white, the outermost feathers on either side pale brown; lores whitish, above which is a small spot of dull orange-scarlet; base of forehead and a broad superciliary streak pale fawn-colour, darker on the latter; crown of the head black with a rounded spot of white near the end of each feather; all the under surface faint creamy-white with a patch of yellow on the centre of the fore neck; the vent and under tail-coverts washed with pale yellow. Total length 4 inches, wing 2·5, tail 1·3, bill 0·28, tarsus 0·8.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, Western New South Wales, Central Australia.

THE Fawn-eyebrowed Diamond-bird is widely distributed over the northern half of the Australian continent. There are specimens in the Australian Museum collection obtained at Dnnrobin and Georgetown, in the Gulf District, Queensland, from the neighbourhood of the Victoria River, in the Northern Territory of South Australia, and from Derby, North-western Australia. At the latter locality it appears to be fairly numerous, many specimens being obtained there by Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower; Mr. G. A. Keartland also procured examples near the junction of the Fitzroy and Margaret Rivers and other parts of North-western Australia. Specimens were also obtained by the Horn Scientific Expedition in Central Australia, where on several occasions Mr. C. E. Cowle has found it breeding. Dr. W. Macgillivray informs me that it is fairly common in the Cloncurry District, Northern Queensland, nesting in sandy banks of creeks and gullies during July and August. The late Mr. George Barnard

obtained it on the Dawson River, and Mr. K. Broadbent has recorded it from Charleville. I have never seen a properly localized specimen from the coastal districts of Queensland, nor from any part of New South Wales, but Dr. R. B. Sharpe records a specimen from Bourke on the Darling River, in the western part of the latter State.* There are also two specimens in the old mounted collection in the Australian Museum, labelled,—“Locality, New South Wales.”

Immature birds are darker on the upper parts and especially in the centre of most of the feathers, giving them a mottled appearance, the yellow patch on the centre of the fore neck is smaller, and the sides of the neck and body are distinctly washed with creamy-brown. In an adult female from Derby, a distinct yellowish wash to the feathers extends over the breast and abdomen. An adult male from the Victoria River, in the Northern Territory of South Australia, has the broad streak over and behind the eye rich fawn colour. Gould's figures of this species in his “Birds of Australia,” taken from the then only known specimen, are much darker on the upper parts than any examples I have seen. His vernacular name given to this species I have discarded, as it is an obvious misnomer.

Mr. G. A. Kearland sends me the following note:—“I first met with *Pardalotus rubricatus* in June 1894, hopping amongst the foliage of the stunted *Eucalypti* on the banks of the Finke River, Central Australia. As I saw several birds go in and out of hollow branches I came to the conclusion that they intended nesting there, but an examination of several failed to reveal any eggs. However, on a subsequent occasion, Mr. C. E. Cowle observed a small bird enter a hole in the bank of a creek. He sent a blackfellow to stop the entrance, and then carefully removed the earth until he reached the nest and captured the bird sitting on four eggs. He forwarded both skin and eggs to establish the identity of the latter which were of normal size. About a month later he saw another bird under similar circumstances. This was also captured and skinned, as the eggs were so small that he thought I would imagine he had made a mistake in the species. Mr. Cowle stated that the nest was two feet six inches from the entrance of the tunnel. During the journey of the Calvert Exploring Expedition across North-western Australia, I saw these birds several times, and obtained some fine specimens near the junction of the Fitzroy and Margaret Rivers, North-western Australia. They seem to confine themselves to the Eucalypt trees as I never saw them in any other.”

Mr. H. G. Barnard sent the following note when forwarding a set of three eggs taken by him at Duinga, Queensland, on the 24th July, 1906:—“*Pardalotus rubricatus* generally breeds on sand ridges, making their burrows in small holes grubbed out by kangaroo-rats when searching for roots. These birds are very shy, and when flushed from their burrows dart swiftly away and do not return for some time. Eggs three or four in number for a sitting; the breeding months are from July to October.”

A nest of this species, taken by Mr. C. E. Cowle, from the end of a tunnel in a sandy bank of a creek at Illamurta, in Central Australia, is a rounded structure with a rather large entrance, it averages four inches in external diameter, and is formed entirely of strips of silvery-grey bark and fine grass.

The eggs are three or four in number, rounded-oval in form, pure white, the shell being close-grained, smooth and lustreless. A set in Mr. Kearland's collection, from the above described nest, measures:—Length (A) 0.77 × 0.55 inches; (B) 0.77 × 0.55 inches; (C) 0.68 × 0.52 inches; (D) 0.7 × 0.55 inches. A set of two taken by Mr. C. E. Cowle, on the 7th February, 1899, measures:—Length (A) 0.77 × 0.57 inches; (B) 0.77 × 0.55 inches. Two eggs in the Australian Museum collection of a set of three taken by Mr. H. G. Barnard, at Duinga, Queensland, on the 24th July, 1906, measures:—Length (A) 0.75 × 0.53 inches; (B) 0.75 × 0.52 inches.

* Sharpe, Cat. Bds. Brit. Mus., Vol. X, p. 60 (1885).

Pardalotus melanocephalus.

BLACK-HEADED DIAMOND-BIRD.

Pardalotus melanocephalus, Gould, Proc. Zool. Soc., 1837, p. 149; *id.*, Bds. Aust., fol., Vol. II., pl. 40 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 165 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 60 (1885).

ADULT MALE.—*General colour above ashy-brown slightly tinged with olive; rump and upper tail-coverts buffy-brown, brighter on the former; upper wing-coverts and quills black, the basal portion of the third to the seventh primaries, except a narrow margin on the inner web close to the shaft white, the secondaries edged with white around the tips, which extends also on to the apical portion of the outer webs of the innermost; tips of primary-coverts crimson; tail black, the lateral feathers with a spot of white at the end of the inner web, these spots becoming larger towards the outermost feathers on either side; lores, forehead, crown, and sides of the head black; a broad streak extends from the nostril on to the sides of the nape, the anterior portion being orange-yellow, and that above and behind the eye white; cheeks and sides of throat whitish; chin, centre of throat and fore neck bright yellow; centre of the breast and abdomen white separated from the sides of the breast, which are pale buffy-brown, by a line of yellow; flanks and under tail-coverts pale buff. Total length 3.5 inches, wing 2.35, tail 1.3, bill 0.28, tarsus 0.7.*

ADULT FEMALE.—*Similar in plumage to the male.*

Distribution.—Queensland, Northern New South Wales.

OVER nearly the whole of the coastal and contiguous districts of Eastern Queensland and North-eastern New South Wales the present species is generally distributed in favourable situations. Specimens obtained by Messrs. E. J. Cairn and Robert Grant at Double Island, near Cairns, North-eastern Queensland, are slightly smaller and have the rump, upper tail-coverts, and flanks of a richer buff, and the centre of the breast and abdomen of a purer white than specimens procured in the Clarence River District, New South Wales. The wing-measurement of adult males from the former locality being 3.35 inches, and of the latter 3.5 inches.

In habits *Pardalotus melanocephalus* resembles *P. punctatus*, resorting to trees principally to obtain its food, which consists entirely of insects, and nesting at the end of a tunnel made in the ground. It was common during my visit to the Clarence River in November 1898, Mr. George Savidge drawing my attention to it nesting in a bank on the roadside close to South Grafton. Several of its nests with eggs were dug out during my stay at Copmanhurst. The breeding season is as a rule much earlier, Mr. Savidge having taken eggs in May, June, and July. At Duaringa, Queensland, the late Mr. George Barnard informed me that this species was breeding in July and August, 1888, the coldest months of the year, the thermometer in the early morning being frequently down below 20°.

From Copmanhurst, Mr. George Savidge sends me the following notes:—" *Pardalotus melanocephalus*, is as you know, common in the Upper Clarence River District. It breeds nearly all the year round, I have observed it burrowing in March and April and have taken eggs in December, but the middle of July seems to be the height of their breeding season. These birds usually form burrows about eighteen inches in length in banks, making their nests, which are generally dome-shaped but sometimes open at the top, principally of narrow strips of bark and bark fibre." Writing in June 1907, Mr. Savidge remarks:—" I took eggs from a nest of *Pardalotus melanocephalus* this year formed at the end of a burrow in the earth of an uprooted tree. Close to it side by side, in a similar position, was the nesting place of *Halycon macleyi*."

The nest is built of fine strips and shreds of bark intermingled with fine dried grasses, and is constructed in an enlarged chamber at the end of a tunnel, from eighteen inches to two feet in

length in the ground. As will be seen from Mr. Savidge's notes, it is usually dome-shaped in form with an entrance at the side, but sometimes cup-shaped or open at the top.

The eggs are usually four in number for a sitting, pure white, rounded-oval in form, the shell being close-grained, smooth and slightly lustrous. A set of four taken by Mr. H. G. Barnard, at Duaringa, on the Dawson River, Queensland, measures:—Length (A) 0.66×0.55 inches; (B) 0.62×0.55 inches; (C) 0.68×0.55 inches; (D) 0.63×0.54 inches. A set of four taken by Mr. G. Savidge, at Copmanhurst, on the Upper Clarence River, New South Wales, on the 3rd October, 1897, measures:—Length (A) 0.66×0.55 inches; (B) 0.68×0.55 inches; (C) 0.7×0.55 inches; (D) 0.71×0.58 inches. It will be observed that the above eggs vary almost the tenth of an inch in length, yet they are nearly all of a uniform breadth.

Young birds resemble the adults but are duller in colour, the crimson tips to the primary-coverts are smaller, the head is dingy ashy-brown, not black, there is only a slight indication of the broad white superciliary stripe, the throat is white tinged with yellow, and there are no yellow stripes separating the white centre from the sides of the breast. Wing 2.2 inches.

Pardalotus uropygialis.

YELLOW-RUMPED DIAMOND-BIRD.

Pardalotus uropygialis, Gould, Proc. Zool. Soc., 1839, p. 143; *id.*, Bds. Austr., fol., Vol. II., pl. 41 (1848); *id.*, Handbk. Bds. Aust., Vol. I., p. 166 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 62 (1885).

ADULT MALE—*Like the adult male of PARDALOTUS MELANOCEPHALUS, Gould, but having the upper parts pale ashy-brown, and the rump and all but the longest upper tail-coverts rich yellow; on the under surface it is lighter on the sides of the neck, and the centre and sides of body. Total length 3.5 inches, wing 2.35, tail 1.2, bill 0.3, tarsus 0.7.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, Northern Queensland.

THE present species is chiefly an inhabitant of North-western Australia and the Northern Territory of South Australia, its range extending as far east as the Burke District of Northern Queensland. In several apparently adult specimens in the Australian Museum collection obtained by Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower, near Derby, North-western Australia, three of them marked females, have the feathers on the crown of the head blackish-brown with faint ashy-brown tips.

From *Pardalotus melanocephalus* this species may be chiefly distinguished as pointed out by Gould, by the bright yellow colouring of the rump. In Gould's figure in his "Birds of Australia," this part is, however, erroneously coloured, and the figure altogether more closely resembles the northern and brighter coloured form of *Pardalotus melanocephalus* inhabiting the north-eastern portion of Queensland. In *P. uropygialis* the depth of colour of the orange streak behind the nostril varies, in some specimens it is much richer than others.

"This species," writes Dr. E. P. Ramsay, "is an inhabitant of the Gulf of Carpentaria District. I have seen it from the Norman River, and also received the head, wings, and tail, accompanied with eggs from Mr. William E. Armit, taken on the Etheridge River, where he found it breeding in tunnels dug in the banks of creeks and water-courses, in company with *P. rubricatus*. Eggs four in number for a sitting, length 0.7×0.55 inches, and like the eggs of all the other species of a pearly-white colour."³

³ Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. II., p. 110 (1877).

Immature males have the crimson tips to the primary-coverts smaller and the feathers on the crown of head dull black, some of them having ashy-brown tips.

Pardalotus quadragintus.

FORTY-SPOTTED DIAMOND-BIRD.

Pardalotus quadragintus, Gould, Proc. Zool. Soc., 1837, p. 148; *id.*, Bds. Austr., fol., Vol. II., pl. 37 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 160 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 62 (1885).

ADULT MALE—*General colour above dull olive-green with blackish margins to most of the feathers, the apical portion of those on the head having small blackish centres; upper tail-coverts olive-yellow, the longest ones having dull grey centres, narrow blackish shaft lines and brighter yellow tips; lesser wing-coverts like the back, the median and greater coverts black with a rounded spot of white at the tip; quills blackish, all but the outermost primary with a spot of white at the tip of the outer web, increasing in size towards the innermost secondaries, most of the quills being narrowly edged externally with greyish-white, the outer web of the first primary edged with white; tail feathers dusky-grey, blackish towards the tips which are edged with white; lores, feathers above and below the eye and the ear-coverts dull olive-yellow; all the under surface ashy-white with indistinct dusky centres to the feathers, the sides of the breast and abdomen washed with olive-yellow; under tail-coverts yellow. Total length 3.5 inches, wing 2.25, tail 1.3, bill 0.25, tarsus 0.7.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Tasmania; King Island, Bass Strait.

ALTHOUGH conspicuously marked on the wings the Forty-spotted Diamond-bird is otherwise the most uniformly plumaged species of the genus, from all members of which it may also be distinguished by its comparatively small bill. The only place I observed this species during a visit to Tasmania in December 1906, was at the Cascades near Hobart. There are a number of specimens in the Australian Museum collection obtained by Mr. George Masters at the Ouse River and Mount Wellington, and by Mr. K. Broadbent at Badger Head. Specimens were also procured by the members of the Field Naturalist's Club of Victoria on King Island, in Bass Strait.

Mr. George K. Hinsby sends me the following note:—"Pardalotus quadragintus inhabits Eastern and Southern Tasmania. It frequents only the Eucalyptus forests, not being found in the large tracts of Myrtle or Pine of the South-west and West. I found it breeding in the high gums (*Eucalyptus viminalis*) at the heads of the Scamander and George Rivers. It is usually found in gums from one hundred to three hundred feet high and scrub of different varieties beneath, and it appears only to exist on the Eucalypts; I have never seen it feeding on other varieties of trees. I took a nest on Bruny Island from a hollow spout of a White Gum, it was the lowest I have seen and was about thirty feet from the ground. The nest is a dome-shaped compact structure, made principally of the fibre of Eucalyptus bark, and the eggs are white and usually four in number. I observed this species at South Port, on D'Entrecasteaux Channel, and wherever the Eucalyptus occurs in forest along the channel and Derwent River to Glenora, in fact all over the country except in too open forests."

The following information has been extracted from notes sent me by Mr. A. L. Butler of Hobart:—"Pardalotus quadragintus is difficult to locate, as it is very silent, and is usually searching for food amongst the thick leaves of the Blue Gum, over thirty feet from the ground. The position of the nest is in a hollow limb of a tree, about twenty-five to thirty-five feet from the ground, and usually from eight to twelve inches from the opening. The nest is made of fine

bark, and in one instance was lined with fine grass, and is about three inches in diameter. The eggs are three in number, white, slightly longer than those of *P. punctatus*, and about the same breadth. I have only taken two sets of eggs, and found one nest with three young ones about two or three days old. Two of the nests were taken in a gully on the southern slope of Mount Nelson, near Hobart, and the third on the slope of Mount Wellington, near Glenorchy. The nests with eggs were taken on the 4th December, 1882, and the 28th December, 1886; the nest with young was found on the 6th January, 1886. I have once seen this bird feeding four young ones, but regard three eggs to be the normal number for a sitting."

The eggs are three or four in number, varying from oval to an ellipse in form, pure white, the shell being close-grained, smooth, and lustreless. A set of four taken on Mount Wellington, near Hobart in October 1885, measures:—Length (A) 0.65×0.5 inches; (B) 0.65×0.51 inches; (C) 0.63×0.52 inches; (D) 0.66×0.5 inches. A set of three in Mr. G. A. Keartland's collection, received with a skin of the parent, measures:—Length (A) 0.63×0.5 inches; (B) 0.64×0.52 inches; (C) 0.62×0.5 inches.

EXPLANATION OF PLATE A. 12.

Nest of *PTILODIS LEWINI*.

Lewin's Honey-eater.



EXPLANATION OF PLATE B, X.

- Figs. 1, 2. *PTILOTIS LEWINI*.
 Lewin's Honey-eater.
- Figs. 3, 4. *MONARCHA MELANORPIS*.
 Black-faced Flycatcher.
- Fig. 5. *FALCUNCULUS FRONTATUS*.
 Crested Shrike-Tit.
- Fig. 6. *PLECTORHYNCHUS LANCEOLATUS*.
 Lanceolated Honey-eater.
- Figs. 7, 8. *ARTAMUS LEUCOGASTER*.
 White-rumped Wood Swallow.
- Figs. 9, 10. *ARTAMUS ALBIVENTRIS*.
 White-vented Wood Swallow.
- Figs. 11, 12. *ARTAMUS MELANOPS*.
 Black-faced Wood Swallow.
- Figs. 13. *PACHYCEPHALA GLAUCURA*.
 Grey-tailed Thickhead.
- Fig. 14. *PACHYCEPHALA GILBERTI*.
 Gilbert's Thickhead.
- Fig. 15. *PACHYCEPHALA OCCIDENTALIS*.
 Western Thickhead.
- Fig. 16. *PTILOTIS FRENATA*.
 Bridled Honey-eater.
- Figs. 17, 18. *ARTAMUS SORDIDUS*.
 Wood Swallow.
- Fig. 19. *CINCLORAMPHUS CEURALIS*.
 Brown Singing-Lark.
- Fig. 20. *CUCULUS VARIEGATUS*.
 Pallid Cuckoo.
- Fig. 21. *PTILOTIS LEUCOTIS*.
 White-eared Honey-eater.
- Fig. 22. *CERTHIONYX VARIEGATUS*.
 Pied Honey-eater.
- Fig. 23. *AMYTIS TEXTILIS*.
 Grass-Wren.
- Fig. 24. *AMYTIS STRIATA*.
 Black-cheeked Grass-Wren.
- Fig. 25. *PTILOTIS FLAVIGULARIS*.
 Yellow-throated Honey-eater.
- Figs. 26, 27. *PTILOTIS FLAVA*.
 Yellow Honey-eater.
- Fig. 28. *MONARCHA GOULDI*.
 Black-fronted Flycatcher.
- Fig. 29. *MONARCHA ALBIVENTRIS*.
 White-bellied Flycatcher.
- Fig. 30. *ARSSES LOREALIS*.
 White-lored Flycatcher.
- Figs. 31, 32. *SISURA INQUIETA*.
 Restless Flycatcher.
- Fig. 33. *SAULOPROCTA MELALEUCA*.
 Black and White Fantail.
- Fig. 34. *MYIAGRA NITIDA*.
 Shining Flycatcher.
- Fig. 35. *ARTAMUS MINOR*.
 Little Wood Swallow.
- Fig. 36. *CACOMANTIS VARIOLOSUS*.
 Brush, or Square-tailed Cuckoo.



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EXPLANATION OF PLATE B. XI.

- Fig. 1. *ANTHOCHERA PARADOXA*.
Great Wattled Honey-eater.
- Figs. 2, 3. *DICRUEUS BRACEATUS*.
Drongo-Shrike.
- Fig. 4. *ANELLOBIA LUNULATA*.
Lunulated Wattle-bird.
- Figs. 5, 6. *ENTOMYZA CYANOTIS*.
Blue-faced Honey-eater.
- Figs. 7, 8, 9. *GRALLINA PICATA*,
Magpie-Lark.
- Figs. 10, 11. *MYZANTHA GARRULA*.
Garrulous Honey-eater.
- Fig. 12. *ACANTROGENTIS RUFIGULARIS*.
Spiny-checked Honey-eater.
- Figs. 13, 14. *MYZANTHA FLAVIGULA*.
Yellow-throated Miner.
- Fig. 15. *MYZANTHA OBSCURA*.
Sombre Miner.
- Figs. 16, 17. *MELIPHAGA PHRYGIA*.
Warty-faced Honey-eater.
- Fig. 18. *PTILOTTIS MACLEAYANA*.
Macleay's Honey-eater.
- Fig. 19. *PTILOTTIS AURIGOMIS*.
Yellow-tufted Honey-eater.
- Fig. 20. *PTILOTTIS SONORA*.
Singing Honey-eater.
- Fig. 21. *MELIORNIS NOVE-HOLLANDIE*.
New Holland Honey-eater.
- Fig. 22. *MELIORNIS SERICEA*.
White-checked Honey-eater.
- Fig. 23. *MANORHINA MELANOPHRYS*.
Bell-bird.
- Fig. 24. *PTILOTTIS PLUMULA*.
Plumed Honey-eater.
- Fig. 25. *PTILOTTIS FUSCA*.
Fuscous Honey-eater.
- Fig. 26. *MELITHREPTUS OULARIS*.
Black-throated Honey-eater.
- Fig. 27. *MELITHREPTUS VALIDIROSTRIS*.
Strong-billed Honey-eater.
- Fig. 28. *MELITHREPTUS MELANOCEPHALUS*.
Black-headed Honey-eater.
- Fig. 29. *PTILOTTIS PENICILLATA*.
White-plumed Honey-eater.
- Fig. 30. *PTILOTTIS CHRYSOPS*.
Yellow-faced Honey-eater.



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Immature males have the crimson tips to the primary-coverts smaller and the feathers on the crown of head dull black, some of them having ashy-brown tips.

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Distribution—Tasmania; King Island, Bass Strait.

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Family HIRUNDINIDÆ.

Sub-family HIRUNDININÆ.

Genus HIRUNDO, *Linnaeus*.

Mirundo neoxena.

WELCOME SWALLOW.

Hirundo neoxena, Gould, Proc. Zool. Soc., 1842, p. 131; *id.*, Bds. Austr., fol., Vol. II., pl. 13 (1848); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 144 (1885).

Hirundo frontalis, (*neq* Quoy et Gaim.), Gould, Handbk. Bds. Austr., Vol. I., p. 107 (1865).

ADULT MALE—*General colour above glossy steel-blue; lesser and median wing-coverts like the back, the greater coverts and quills dusky-brown slightly glossed with green, which is more distinct on the innermost secondaries; tail feathers dusky-brown, slightly glossed with green, all but the central pair with a large subterminal spot of white on the inner web and passing into an oblique band on the outermost feather on either side; forehead and occiput dull chestnut-red, a line of feathers extending from the nostril in front of the eye dusky; chin, cheeks, and throat light chestnut-red; remainder of the under surface very pale brown, whitish on the centre of the breast and the abdomen, under tail-coverts dull white washed with pale brown, the longest feathers with dull glossy greenish-black tips. Total length in the flesh from tip of bill to end of outermost tail feathers 6·6 inches, wing 4·6, central tail feathers 2, outermost tail feather 3·6, bill 0·28, tarsus 0·4.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, North-western Australia, Tasmania.

PROBABLY no bird is better known throughout Australia and Tasmania than the Welcome Swallow. Whether it is our lot to dwell in a city or in lonely out-lying districts, we are almost certain to have the company of this sociable little bird, for the greater part, if not the entire year. It is a resident species in the neighbourhood of Sydney and is usually met with in pairs during the normal nesting season from August until the end of December or January, or accompanied only by its young. The flight of this Swallow is most graceful and rapid, whether flying a few inches above the ground, or hawking for insects in flocks high in the air. During the spring and summer months one may meet it in the streets of the city coming at a great rate

directly towards one, but with a graceful curve it manages to thread its way though the labyrinth of pedestrians, horses and vehicles with the greatest ease. After the breeding season, to a large extent it forsakes the streets of Sydney during the day, congregating in large flocks about Hyde and Cook Parks and the Sydney Domain. These flocks may be seen, more particularly during dull weather, from February until July, and in some seasons returning to the city again about dusk, and perching for the night in a sheltered situation on some large building. Before these flocks take up their quarters for the night they may also be seen occasionally perched close together on telegraph wires. At one time I regarded these flocks as pre-migration meetings, but for many years past I have noticed the birds remain here in flocks throughout the winter, and then associate in pairs as the spring ensues. One of their roosting-places is the Custom House, opposite Circular Quay. Throughout June and July I have noticed just about dusk small flocks from five to ten in number constantly arriving and taking up their quarters on a narrow stone ledge near the top of the building. This ledge was only wide enough for the birds to perch parallel along it, but they were perched as close as possible, forming a continuous black line around the facade of the building, which is protected at either end by portion of it being extended at right angles. It is probable that they congregate there too throughout the autumn months, but it is daylight then when I usually pass there. Throughout June and July 1905 I roughly estimated there were five hundred Swallows perched there every night. Of course the birds had long left their quarters when I passed there again each morning, but there is abundant evidence of this particular ledge being resorted to as a roosting place. I did not observe them in the lengthening days of August until the 30th instant, when I observed about sixty birds in the most sheltered part of the building. A strong south-westerly gale was blowing at the time, followed by a wild and boisterous night, shipwrecks with loss of life occurring on the coasts. The following day the gale subsided, and not a Swallow was to be seen when I passed in the evening. At Gerringong I have also disturbed numbers of these birds while roosting at night time in small caves and clefts of rocks facing the sea.

Mr. A. E. Ivatt wrote me as follows from Glanmire near Bathurst in December, 1896:—
“*Hirundo neoxena* remained about here all through last winter, a fact I have not noticed before. One was flying about amid the flakes of falling snow, another dipped down on to the ice-covering of a large waterhole. I give these instances to show the severity of the weather.”

From Broken Hill in South-western New South Wales, Dr. Macgillivray writes me:—
“*Hirundo neoxena* is numerous throughout the winter in this district, provided the season is a good one. They nest in varying situations often in large open hollows of trees, cave-like openings in cliffs and in abandoned prospecting shafts. Last year I found one with young birds forty feet down a well, and when the nest was examined, the mother bird flew twenty feet further down, perching on the sides. At Inkermann Swamp, a large sheet of water on open plain country, I found two nests in an old bucket hanging on a wire fence.”

Mr. E. A. Holden, of North Sydney, sends me the following note:—“The 20th and 21st June, 1907, will long be remembered along the coastal districts of North Queensland, as two of the coldest days on record. Although the maximum and minimum temperatures—approximately 60° and 50° were not by any means the lowest recorded north of Townsville, the entire absence of sun, a drizzling rain which was practically sleet, and a cold westerly wind constituted ‘weather’ which in those latitudes was entirely phenomenal. The birds suffered terribly. At Geraldton, the writer saw rows of Swallows (*Hirundo neoxena*) huddled together at 10 a.m. on the clothes lines, every inch of space being occupied, their feathers fluffed out and evidently in abject misery. At Lucinda Point, Macleay’s Kingfishers, Sunbirds, and in fact representatives of all the bright plumaged inhabitants of the great tract of mangrove swamp sought refuge in the buildings and the goods storage sheds; along the railway line I was informed by the platelayers

that they had seen birds fall and die in all directions, and had picked up many dead bodies. They substantiated this by shewing me the remains of several birds which were alleged to have died of the severe cold."

The food of this species, like all the members of this family, consists exclusively of insects, and is captured during flight. Its principal call note resembles "sweet, sweet," which is varied occasionally, especially when perched, with a succession of cheerful and melodious strains.

The nest of the Swallow is so well known as to barely need description. In form it varies according to the position in which it is built. When placed upon the top of a ledge of masonry or woodwork it is usually cup-shaped in form, but as often as not, if built in an angle, or a horizontal wall forms one side of it. It is composed of pellets of mud, and is warmly lined inside with dried grasses, horse-hair and feathers. An average nest measures externally five inches in diameter by three inches in depth. Along the coasts of New South Wales, and also on the rocky banks of the Upper Clarence River, I have found it nesting on ledges of rock or in small hollowed out chambers in the side of, or underneath a hanging cliff. From Port Hacking to Gerringong, in the Illawarra District, I have seen many nests with eggs or young in cliffs facing the sea. It may have been heredity which caused these birds to cling to their natural breeding places. Since the advent of settlers in Australia, this Swallow builds chiefly under the protection of man, about houses, stables, or out buildings, or under verandahs, culverts, and bridges. At Gerringong, a district devoted to dairying, I failed, however, to discover a single nest in any of these situations, and there were large stables and cow sheds only a few hundred yards away from the cliffs. About houses all kinds of situations are selected as nesting sites, the smooth wall of an occupied room is often availed of, if a window or door is left open for ingress and egress. At Mr. J. A. Boyd's house at Eden, I noted nests built between the ceiling and the roof, the birds gaining access by way of the corrugations of the iron roof. In the hall two nests had been built on aboriginal weapons placed on the walls; in the dining room one was built on the lamp shade hanging down in the centre of the room. At Woodside near Coonamble in October 1905, I found a pair had nearly completed their nest on the folds at the top of some white curtains in the drawing room, access being gained by the birds through a fanlight and the French doors remaining open all day. Mr. J. Gabriel informs me that at Werribee, Victoria, a pair nested for several seasons in a disused dog-kennel. Dr. L. Holden found a nest in an old ship's galley, lying on its side at the end of a sawmill jetty, and in a similar situation in a laid up cutter, I saw a nest at Middle Harbour, on the 9th November, 1908, containing four nearly fledged young. At Toorak, Victoria, I once found a nest containing young built on the remaining half of a horizontally broken off hollow limb of a tree, the curved wood below forming a resting place for the nest, and the upper portion a protection for the bird while sitting.

A nest presented to the Trustees of the Australian Museum, by Mr. C. F. Bolton of "Moorong," Wagga Wagga, is built in one of the most curious sites I have known this species to select. It is placed on the top of a number of filed accounts. With it Mr. Bolton sent the following note:—"I am sending you a Swallow's nest constructed in a peculiar position. I had some files of bills hanging up in my 'gun-room' on the verandah, in which is a broken pane of glass. For three years a pair of Swallows built on each of these files, the fourth year they re-occupied the nest I send you after repairs and additions to it." Miss. G. Ashcroft presented a nest, in which four young ones were hatched, built on top of a round tin, just sufficiently large enough for the structure, which was standing on a shelf at Crookwell.

The eggs are four or five in number, oval or elongated oval in form, the shell being close-grained, smooth, and almost lustreless. They are of a dull white, freckled and spotted with different shades of purplish-brown, intermingled with a few underlying spots of bluish or ink-grey, particularly towards the larger end where the markings are more thickly disposed, and

form in some specimens more or less well defined zones. A set of five measures:—Length (A) 0·73 × 0·55 inches; (B) 0·74 × 0·6 inches; (C) 0·76 × 0·56 inches; (D) 0·77 × 0·59 inches; (E) 0·74 × 0·58 inches. Another set taken on the 17th October, 1907, from a nest built on a sheltered ledge of rock, at the northern entrance to Port Hacking, New South Wales, measures:—Length (A) 0·73 × 0·53 inches; (B) 0·75 × 0·5 inches; (C) 0·74 × 0·51 inches; (D) 0·72 × 0·52 inches; (E) 0·74 × 0·52 inches.

When photographed, the nestlings here figured, which were taken from a nest under my dining-room window and brought into the Museum in the morning and returned to their parents late on the same afternoon, were then fifteen days old. Above they were blackish-brown with a slight greenish lustre, with small tufts of light fawn-brown down scattered here and there; wings and tail dull smoky greyish-brown; a V-shaped marking on the forehead, the throat and sides of neck dull brick-red; remainder of the under surface dull white, the sides of the body having a creamy-brown wash; under tail-coverts light fawn colour; bill brown; gape light-yellow; legs and feet grey; iris black. Wing 2·4 inches. They all left the nest five days later.



WELCOME SWALLOW (NESTLINGS).

Young birds resemble the adults but are much duller in colour, and have only a slight indication of the rufous band on the forehead; the outermost tail feathers on either side are comparatively shorter, being only four-fifths of an inch longer than the central pair. Length of wing 4·1 inches.

Albinos of this species are not uncommon.

In the neighbourhood of Sydney, August until the end of December, constitutes the usual breeding season, but odd nests may be also found during the first six months of the year. Both sexes assist in the task of nidification and the eggs are deposited daily. At my house at Roseville a pair have bred for many years. A nest was commenced on the 16th September under the eaves of a gable, above my bedroom window, and was apparently finished on the 28th instant. On the 8th October the female was sitting, and fourteen days later was feeding young. On the 8th November, both birds were supplying the wants of the young, whose heads were visible above the nest, and a week later they were flying about, or precisely two months after the nest was first commenced. The following year they were less fortunate, a nest they built under the verandah twice having its lining of feathers pulled out by the introduced House Sparrow, and removed for lining their own nests. On the last occasion two eggs were broken. They abandoned this site and built on the opposite side of the gable. Hearing the Swallows making

a great noise after the female had been sitting for ten days, I found a Starling beside the nest, and before the window could be thrown up and the intruder driven away, I saw it pick up and devour two of the Swallow's eggs. Three young ones were eventually reared from this nest. For a second brood they removed the nest of the previous year on the opposite of the gable and constructed a new one. This is the only occasion I have known this species to remove a nest, but it is a common occurrence for them to build a new nest on the old one of the previous season. I have seen four nests placed one in the other. When able to shift for themselves the young birds left the place, but the old pair remained throughout the year. Odd nests are more often found in the neighbourhood of Sydney during the spring-like weather of March and April. On the 17th March, 1907, I observed a nest with young at Lindfield, and exactly twelve months later one at Chatswood.

Nest-building usually occupies twelve days, the eggs are deposited daily, incubation lasting fourteen days, and the young leave the nest when eighteen to twenty days old.

Genus *CHERAMŒCA*, *Cabanis*.

Cheramœca leucosternum.

WHITE-BREADED SWALLOW.

Hirundo leucosternus, Gould, Proc. Zool. Soc., 1840, p. 172.

Atticora leucosternon, Gould, Bds. Austr., fol., Vol. II., pl. 12 (1848).

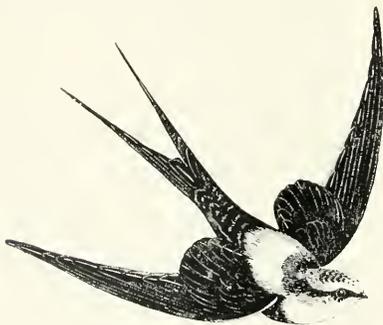
Cheramœca leucosterna, Gould, Handbk. Bds. Austr., Vol. I., p. 115 (1865).

Cheramœca leucosternum, Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 171, (1885).

ADULT MALE—Forehead and crown of the head white, the central portion of the latter pale brown, the nape and hind neck brown; mantle and upper back pure white; lower back, rump and upper tail-coverts black; wings and tail black; lores black; feathers below the eye and the ear-coverts brown; throat, foreneck and upper breast pure white; lower breast, abdomen and under tail-coverts black; under wing-coverts white; "bill blackish; legs and feet flesh-colour, iris reddish-brown" (Bennett). Total length 5·8 inches; wing 4, central tail feathers 1·55, outer tail feathers 3·1, bill 0·22, tarsus 0·5.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Queensland, New South Wales, South Australia, Central Australia, Western Australia, North-western Australia.



WHITE-BREADED SWALLOW.

THE range of the White-breasted Swallow extends over the south-western portion of Queensland, Western New South Wales, Central Australia, South Australia, Western and North-western Australia. Mr. George Masters obtained adults and young at Mongup, Salt River in Western Australia in 1869, Mr. K. Broadbent at Port Augusta, South Australia; the late Mr. K. H. Bennett, at Moolah; and Mr. E. L. Ramsay near Louth, Western New South Wales. Specimens were obtained by the members of the Horn Scientific Expedition in Central Australia, and by the Calvert Exploring Expedition in Western Australia.

Mr. T. Carter informs me that he has found it breeding at Point Cloates in North Western

Australia. It is remarkable that in Eastern Australia it is strictly an inland species, while in South and Western Australia it also occurs on the coast. I met with it at Narrabri in November 1896, nesting in the soil in the upper portion of a quarry near Little Mountain, but did not meet with a single specimen eighty miles further to the north at Moree. I saw two pairs at Henley Beach, near Adelaide, in December 1900, and several days later in the same locality, Dr. A. M. Morgan showed me old nesting burrows in the road side.

The food of this species consists of insects, captured chiefly during flight, and while so engaged it performs many graceful evolutions, its strikingly contrasted black and white plumage rendering it a most conspicuous object, and enabling one to easily distinguish it from any other species of Australian Swallow.

There is a variation in the colour of the centre of the crown of the head of adult specimens. Most have this part uniform brown or with paler margins to the feathers, others have it white with very small dark brown centres to the feathers.

From Broken Hill, Dr. W. Macgillivray writes me:—"I have noted *Cheramæca leucosternum* throughout the year, either in pairs or small companies. They nest from the latter part of August until November, the situation chosen is either the vertical bank of a creek or a side of a washaway, sometimes nesting singly, at other times in company. I do not think they nest in company from choice, it is simply because a certain spot happens to be a favorable one for their burrowing operations. The burrow is a long one, usually two or three feet, and at the end an oval chamber in which is placed the nest constructed of small leaves of Eucalyptus or Mulga, the nest is usually about four inches in diameter, and is compact, the layer of leaves below the eggs being often nearly one inch in thickness. The set consists almost invariably of five eggs."

From Cobborah Station, Cobborah, New South Wales, Mr. Thos. P. Austin sends me the following notes:—" *Cheramæca leucosternum* appears to be a stationary species here, as a few pairs are to be seen flying about at all times of the year, but just before breeding commences they keep in small flocks of from four to ten in number, and are very often in company with *Petrochelidon ariel*. Gould states that they usually fly very high, such is not the case in this district, as they are seldom to be seen flying more than about a hundred feet from the ground. In certain lights they appear to be most extraordinary shaped birds, their white head and chest is quite invisible, and they just look like a pair of wings and a tail flying about. Sometimes they breed in small communities, boring a small tunnel from two to three feet in length in banks of creeks and rivers where ever the soil is soft enough, many of the tunnels are deserted when only bored a few inches through the soil being too hard. Even in the sandy soil they take a very long time to complete their nest, usually commencing the tunnel about the middle of September, but the eggs are sometimes not laid till November. The nest consists of about two hand's full of dry leaves and grass, which are placed in a round chamber at the end of the tunnel, where they lay from three to six pure white eggs. Excepting in the breeding season I have never seen this species perched on a tree, and even then only upon dead trees, and that very seldom."

Dr. A. M. Morgan has kindly forwarded me the following interesting notes:—" *Cheramæca leucosternum* I have met with in every part of South Australia, and found them breeding from Henley Beach, seven miles west of Adelaide, to Arcoona one hundred and twenty miles north-west of Port Augusta. They are not common in the south but breed regularly in the sandhills at Henley Beach, also in the golf links at Glenelg. At Laura they breed every year in the banks of the Rocky River. At Port Augusta and north of there they are the commonest Swallow, and every sand bank is riddled with their nesting holes. The nests I have found in the southern part of the State were formed of dried grasses, but at Port Augusta and north of there they are made of narrow mulga leaves. The nests are very clumsily constructed and will not bear removal, and as many as six eggs are sometimes laid. The old holes are much used by *Xerophila*

leucopsis for their nests; they widen them just inside the entrance and build there, never going to the chamber at the end of the burrow. When much disturbed, as these birds were at Laura, they will drill holes three feet six inches to four feet in length, but to the north of Port Augusta the holes are usually only eighteen inches to two feet in length. When there are a number of these birds they sometimes make a common shelter burrow. The entrance is like a nesting burrow but it widens out inside to a diameter of six or eight inches and as much as three feet in length, the chamber being approximately twice as high as broad. At Mount Gunson on the 29th July, 1900, I found *Psephotus multicolor* breeding in an old burrow of these birds. The burrow contained one Parrakeet's egg and the female was shot on leaving it."

Mr. Chas. G. Gibson writes me:—"At Laverton, Western Australia in 1905, I found *Cheamæca leucosternum* nesting in the side of an old tailings dump on the 4th September. On the 18th October, I dug out a nest containing four young, in the side of a tenanted rabbit-burrow. Also another on the 27th October, with four big young, in the side of an old rabbit-burrow. In the East Murchison District of Western Australia, the favourite nesting site of the White-breasted Swallow is in the side of an abandoned shaft where it is usually pretty safe. At Sir Samuel, on the 13th September, 1906, I found a nest in a bank with four fresh eggs, and at Darlot on the 6th October one in an old tailings heap with four fresh eggs, and another in the side of an old shaft with five fresh eggs."

The late Mr. K. H. Bennett wrote as follows from Moolah, in the Central Division of New South Wales:—"Although this bird has a wide range throughout the back country, it is by no means numerous anywhere. It is generally met with in small flocks from five to ten in number skimming over the patches of open ground or swamps, in much the same manner as the common House Swallow (*Hirundo neoxena*); it is not, however, a partial migrant like that species, but remains throughout the year. It forms long tunnels in the sides of the entrances to the burrows of either the Brush-tailed Kangaroo Rat (*Bettongia penicillata*), or the common Rabbit Bandicoot (*Perageles lagotis*), whether inhabited by these animals or not, and in which it sleeps at night. Should one of these dormitories be discovered, the capture of the whole flock is easy, the specimens procured for the Australian Museum being obtained in this way. In a chamber hollowed out at the end of these burrows the female deposits her eggs on the bare sand during the months of September and October. The eggs are five or six in number and pure white."

Mr. Edward Lord Ramsay informs me that during several years residence on Wattagoona Station near Louth, in the Western District of New South Wales, he found many nests of this species. In favourable situations they breed in small communities, boring a tunnel from eight inches to two feet in length in the loose loamy soil of the bank of a dry creek or dam, at the extremity of which a chamber is hollowed out, and on the bottom a small saucer-shaped nest is formed of a thick layer of dead "Mulga" leaves (*Acacia aneura*). Two of these nests in the Australian Museum collection are nearly flat, and average each four inches and a quarter in diameter. In a number of nests examined, five eggs were the usual number laid for a sitting, in one instance only did he find a nest containing six. The eggs are invariably true ovals in form and pure white. The set of six referred to, taken on the 28th September, 1887, measure as follows:—Length (A) 0·63 × 0·5 inches; (B) 0·7 × 0·5 inches; (C) 0·68 × 0·5 inches; (D) 0·69 × 0·5 inches; (E) 0·7 × 0·49 inches; (F) 0·68 × 0·51 inches. Another set of four taken by Mr. Ramsay on the same date, measures:—Length (A) 0·67 × 0·5 inches; (B) 0·67 × 0·48 inches; (C) 0·67 × 0·48 inches; (D) 0·67 × 0·49 inches.

Young birds differ from the adults in having the forehead and crown of the head brown, with a white frontal band extending in a narrow line over the eyes and widening out on the sides of the nape; mantle and upper back white washed with brown; hindneck, lower back, rump, and upper tail-coverts brown, with narrow whity-brown margins to most of the feathers; wings and tail brown, the central tail feathers and all but the outermost quills narrowly edged with

white around their tips; throat and breast white, the latter washed with brown on the lower portion; abdomen and under tail-coverts brown, the latter broadly margined with whity-brown. Wing 3.6 inches.

August and the four following months constitute the usual breeding season of this species in Eastern Australia.

Genus **PETROCHELIDON**, *Cabanis*.

Petrochelidon nigricans.

TREE-SWALLOW.

Hirundo nigricans, Vieill., *Nouv. Dict. d' Hist.*, Tom. XIV., p. 523, (1817).

Collocalia arborea, Gould, *Bds. Austr.*, fol. Vol. II., pl. 14 (1848).

Hylochelidon nigricans, Gould, *Handbk. Bds. Austr.*, Vol. I., p. 111 (1865).

Petrochelidon nigricans, Sharpe, *Cat. Bds. Brit. Mus.*, Vol. X., p. 190 (1885).

ADULT MALE—*General colour above dark steel blue, the bases of the feathers on the mantle, back and rump brownish-white, tinged with sandy buff, with indistinct darker shaft streaks to most of the feathers: upper tail-coverts brown, with brownish-white margins: wings and tail dusky-brown; crown of the head like the back; across the forehead extends a dull rufous band; feathers in front and below the eye blackish; ear-coverts smoky-brown; chin and throat dull white tinged with buff, all the feathers having narrow blackish shaft-streaks: remainder of the under surface dull sandy rufous, paler on the foreneck, richer on the lower flanks and under tail-coverts, the centre of the breast and abdomen almost white; bill black; legs and feet purplish-black, iris black. Total length in the flesh 5.3 inches, wing 4.2, central tail feathers 1.7, outer tail feathers 2.1, bill 0.25, tarsus 0.45.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Western Australia, Tasmania, New Guinea, Aru Islands.

THIS widely distributed species has been recorded from nearly every part of Australia, and is a regular visitant to Tasmania. In New South Wales it is freely distributed from August until the end of March or April, but in mild winters stragglers may be obtained throughout the year. I saw a large flock on the 21st June, 1896, at Goodlet's Bush, Canterbury. They were on the wing "hawking" after insects. It evinces a preference for the coastal districts, particularly those studded with tall and wide spreading Eucalypti. It is also common during the late Spring and Summer months in and around Sydney and Adelaide. In my early collecting days it also used to be common in the Albert Park and Richmond Paddock near Melbourne, where it remained to breed. In both of these localities, even during the breeding season, these birds used to congregate in large flocks on the grassy sward. In company with Mr. George Savidge, at Copmanhurst in December 1907, I saw a large number of these birds nesting in a tall Eucalypt near his house. Some were seen entering holes in hollow limbs, many were performing graceful evolutions on the wing, while a little distance away were a few small flocks resting on the ground.

As pointed out by Gould there is a variation in the depth of colour of the band on the forehead and on the under surface. Some specimens have the breast nearly white and with scarcely a trace of the sandy-rufous hue on the foreneck and sides of the body. The lighter under surface is also characteristic of immaturity as is exhibited by the intermingled smoky-brown and deep steel-blue feathers on the back. I cannot find any appreciable difference in size between examples from Western Australia and New South Wales. The wing-measurement

of an adult male obtained by Mr. George Masters at King George's Sound, Western Australia, in October 1868, is 4.1 inches; of an adult male procured at Ashfield, New South Wales, in May, 4.15 inches. Adult males from different parts of New South Wales vary in wing-measurement from 4.1 to 4.2 inches.

Although Dr. R. B. Sharpe and Mr. Claude W. Wyatt figure this species in their "Monograph of the Hirundinidæ" under the name of *Petrochelidon nigricans*, they remark in their introduction, "*P. nigricans* is apparently a true *Petrochelidon* in form and style of colour; but it breeds in holes of trees, and makes a nest of straw and feathers. It will be probably necessary to separate these Tree-building Swallows from the Cliff-building species so as to include two species in *Hylochelidon*, viz., *H. nigricans* and *H. timoriensis*."

I have never heard of *P. nigricans* using feathers as a lining for its nest, but it does resort to cliffs to breed, and although it does not form a nest there in a true Cliff-Swallow fashion, mud is often used as an aid in narrowing the entrance to the nest.

Mr. Thos. P. Austin of Cobborah Station, Cobborra, New South Wales, sends me the following notes:—" *Petrochelidon nigricans* is very plentiful throughout this district during the latter part of the year and usually departs again about the end of January. They breed here in great numbers, placing their nests in very large dead trees, often in a very small hole at an elbow of a thin branch, and very seldom less than twenty feet from the ground. The nest consists of nothing more than a handful of dry Eucalypt leaves. Often when the bird is sitting she will allow the hole to be chopped open and the eggs taken from beneath her, and even then will not leave her nest. It is not an unusual thing to see more than one pair of birds building the same nest, or several pairs of birds nesting in the same tree, and upon two occasions I have found them nesting in the same branch and within a few feet of *Psephotus haematonotus*. This habit of more than one species of bird nesting in the same tree appears to be no uncommon occurrence. Two trees especially have come under my notice within the past twelve months: one was a very large Yellow Box tree growing along the bank of the Talbragar River on Cobborra Station, New South Wales, in which I noted the following species breeding:—*Corone australis*, *Haliastur sphenurus*, *Grallina picata*, *Eurystomus australis*, *Glossopsittacus concinnus* and *Notophox novae-hollandiæ*. The other tree which came under my notice was a large Red Gum, also growing along the bank of the Talbragar River, and only about one mile from the tree just mentioned. In this tree in 1908 I noticed the following species nesting:—*Haliastur sphenurus*, and attached to the underneath part of this nest a pair of *Steganopleura guttata* had their nest, and within the hollows were the nests of *Dacelo gigas*, *Cacatua galerita*, *Platyercus eximius* and *Psephotus haematonotus*."

From Broken Hill Dr. W. Macgillivray writes me:—" *Petrochelidon nigricans* is a very common bird in the spring, nesting in the gums along all the creeks in this district. It arrives early in the spring or late winter, August being the usual month, and starts nesting right away; by the middle of September most nests contain young. A few birds remain throughout the winter, but most leave here late in April or early in May. Their arrival depends greatly upon the season. In 1903 they were breeding in August. In 1904 very few were seen till late in September. In 1905 and 1906 there were nests in July. They usually nest in a small hollow spout from six to eighteen inches from the opening; sometimes when the opening is large, it is narrowed with mud by the bird. The nest is nearly always composed of small leaves. When the young are hatched, both parents feed them and attend to the sanitary condition of the nest, the excreta being carried out and dropped about thirty to forty feet from the nest, when the old bird comes out after feeding them. If not molested they become very tame. A pair this season reared a brood in the stone work of the dining room at Poolamacca Station."

Both in Victoria and New South Wales I had previously only found this species nesting in the hollow limbs of trees, but on the 4th December, 1900, in company with Dr. A. M. Morgan, I visited "Holmfirth," the residence of Mr. J. H. Mellor, at the Reedbeds near Adelaide, an

estate where all species of native birds are protected and encouraged to breed. *Petrochelidon nigricans* was unusually plentiful; numerous nests were pointed out in all manner of situations, and various receptacles put up for their use. In the stables many hollow limbs of trees, boarded up at one end, long and thick pieces of bamboo with holes cut between the joints, were all availed of by the birds; if the entrance was too large it was narrowed by the birds with accumulated pellets of mud. Deserted nests of *Hirundo neoxena*, built against the sides of the rafters, were also utilized, but had a wide flange of mud pellets built around them, leaving only a narrow space for the new tenants to enter between the top of the nest and the floor of the loft. The newly added material could easily be distinguished by being of a darker colour. In and out of most of these nesting places, which Mr. Mellor informed us were lined with the dried leaves of *Eucalyptus rostrata*, the old birds were entering or leaving, and occupied in feeding their young; in others the birds were engaged in the task of incubation. Outside, under the eaves of the house, were more hollow limbs tenanted by the Swallows. From a book attached to the low eaves of an outbuilding, Mr. Mellor carefully lifted down an old watering can with the spout broken off, and the top covered with a piece of sheet iron, the sitting bird leaving it as he did so. On lifting up the cover it was found that it was filled up to the level of the narrow entrance, where the spout had been, with *Eucalyptus* leaves, intermingled with dried grasses, and resting thereon were four partially incubated eggs. Close to this nest, from a stout nail in the wall, Mr. Mellor lifted an old funnel, with the spout broken off, that had been backed up close to the wall. This nesting place was similarly filled up with leaves and grass to a level with the entrance, and young birds had just left it. Mr. Mellor informed me that the Starlings and Sparrows sometimes drove the Swallows away from their nesting sites, when they resorted to the hollow limbs of trees put up for them, unless the entrance had been narrowed by the Swallows with mud, *Petrochelidon nigricans* was also breeding about the houses in the streets of Adelaide. At Dr. Morgan's residence a pair had constructed their nest in a ventilator.

In response to a request asking if these birds were migratory, Mr. Mellor kindly sent me the following note under date 27th September, 1908:—" *Petrochelidon nigricans* is migratory, but owing to putting up a number of nesting places, many remain with us all the year round. Generally large flocks congregate, and are often seen on the ground, just prior to leaving in the late autumn months, and they return again in large numbers about the end of July."

Regarding the nidification of this species in Tasmania, Dr. L. Holden has kindly supplied me with the following notes:—" *Petrochelidon nigricans* breeds at Circular Head in holes of the cliff, facing the sea. I have seen them carrying in pieces of dry sponge, seaweed and straw. The nest holes in the rock were out of reach, but in a tiny cave on the beach of a neighbouring island, I found them only a few feet from the floor. On the 16th January, 1887, I caught one in its nest in a hollow branch of a tree, containing three half fledged young; the hole was seven feet from the ground, and had the entrance to it partially blocked by a wall of dried mud, constructed by the birds; the hole was capacious inside, and the nest itself mostly rotten wood. At Bellerive, near Hobart, I found them breeding in the verandah of a large dwelling-house. It was in an isolated situation, and had been untenanted for two or three years, save by a caretaker. The nests were scanty arrangements of dirt and straw, placed on ledges, and had no architecture about them."

Mr. E. D. Atkinson also sends me the following note from Tasmania:—" *Petrochelidon nigricans* arrives here about the same time as *Hirundo neoxena*. I have seen it in the north, south and west coasts. I found it breeding abundantly in the crevices of Church Rock, near the mouth of the Arthur River. It also breeds in holes of trees."

The eggs are usually four, sometimes five in number for a sitting, oval in form, some specimens being somewhat sharply pointed towards the smaller end, the shell being close-grained, smooth, and usually lustreless. The ground colour varies from a pinky-white to a very faint creamy-

buff, some specimens of the latter hue being uniformly covered with numerous fleecy markings of a slightly darker shade of the ground colour. Others have well defined zones of dull purplish-red or reddish-brown around the larger end, while some are almost pure white with nearly invisible markings of pale purplish-red. A set of four measures:—Length (A) 0·73 × 0·53 inches; (B) 0·74 × 0·55 inches; (C) 0·74 × 0·53 inches; (D) 0·68 × 0·54 inches.

There is an albino of this species in the Australian Museum.

Probably two broods are reared during the season, which commences at the latter end of August and continues until February.

Petrochelidon ariel.

FAIRY MARTIN.

Collocalia ariel, Gould, Proc. Zool. Soc., 1842, p. 132; *id.*, Bds. Austr., fol., Vol. II., pl. 15 (1848).

Lagenoplastes ariel, Gould, Handbk. Bds. Austr., Vol. I., p. 113 (1865).

Petrochelidon ariel, Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 199 (1885).

ADULT MALE—*Forehead and crown of the head and nape rufous; scapulars and back dark steel-blue, the feathers of the latter having white bases; rump creamy-white; upper tail-coverts brown; wings and tail dusky-brown; lores dull whitish bordered above by a broad blackish stroke; chin and throat whitish; foreneck and sides of the body pale sandy-brown, the feathers on the throat and foreneck having indistinct darker shaft-streaks; remainder of the under surface and under tail-coverts white; bill black; legs and feet grey; iris blackish-brown. Total length in the flesh 4·75 inches, wings 3·65, central tail feathers 1·6, outer tail feathers 1·9, bill 0·22, tarsus 0·4.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, North-western Australia, Tasmania.

IN their excellent "Monograph of the Hirundinidæ," Dr. R. B. Sharpe and Mr. Claude W. Wyatt, who refer vernacularly to the present species as the Fairy Cliff Swallow, remark:—"In the year 1865 the late Mr. Gould instituted the genus *Lagenoplastes* for the Cliff Swallow of Australia, but on comparing the latter species with the Cliff Swallow of America, which belongs to the genus *Petrochelidon*, we were unable to perceive any generic difference, and we have therefore united them."

The Fairy Cliff Swallow, or Fairy Martin as it is more popularly called, is freely distributed in the spring and summer months over the eastern, southern and western portions of the Australian Continent; it is also found in Tasmania. In the neighbourhood of Ashfield, five miles west of Sydney, it usually arrives early in August and departs again about the end of April. It is not, however, a strictly migratory species, for in very mild winters it remains throughout the year. In the protracted winter of 1892 it did not make its appearance until the 2nd September. In the following year it remained until the 3rd June, and was only absent for a few weeks, reappearing again in large flocks on the 27th July. It is remarkable that during the hot months of February and March, these birds are usually absent from the neighbourhood of Sydney, but return again on wet days. Probably it is due to insect life being more abundant in moist and hot weather, for this species is strictly insectivorous, and captures its prey while on the wing. The late Mr. Gould remarks that the Fairy Martin appears to have an antipathy to the country near the sea, and that he had never observed it at Sydney, or even heard of its approaching the coast line nearer than twenty miles. Since, however, the time of Gould's visit to Sydney, in 1832, its immediate neighbourhood has undergone a vast change. What then

was virgin forest, is now thickly covered with houses, which may have been the means of extending the range of this species nearer to the coast. At the present time they are seldom seen in the city, although they are common enough in the breeding season at Ashfield, a few miles away. In Victoria the Fairy Martin is a regular visitant, and numbers used to breed every year at the University of Melbourne. During the journey of the Calvert Exploring Expedition in Western Australia, Mr. G. A. Keartland noted numbers of these birds at Cue and the Fitzroy River, and was informed that their nests are frequently seen among the rocks of the St. George Range. In August, 1900, Dr. A. M. Morgan observed large numbers of these birds at Euro Rock-hole, forty miles north-west of Port Augusta, South Australia. In the cliffs at the side of this hole were many of previous years nests.

The following dates, taken from my note-book, give the times of the arrival and nidification of the Fairy Martin in Ashfield and Enfield, New South Wales, during several years:—

1891—1st July saw one pair; 15th August very common, busy repairing old nests and constructing new ones; 4th September the birds were finished lining the new nests, and to all outward appearances they are now completed; 14th December, birds collecting mud and constructing new nests underneath those finished in September.

1892—4th August noted arrival; 14th August, building their nests under the eaves of a new cottage; 2nd September, lining their nests; 4th November, young birds plentiful; 1st December, building again under the eaves of a new cottage.

1893—26th February, Fairy Martin common; 3rd June, very common in Ashfield; 27th July, still in flocks; 18th August, building under the eaves of houses; 10th November, young birds plentiful.

1894—24th February, 11th March, 22nd April, common about Ashfield; 8th July, in flocks about Ashfield, not observed since last April; 26th August, building under the eaves of houses; 9th September, building; 22nd November, feeding their young.

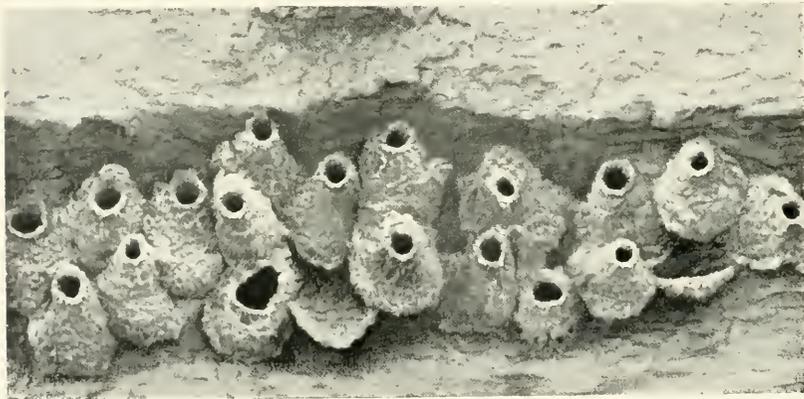
1895—16th February, still plentiful; 23rd June, spring-like weather, saw one pair; 14th July, flocks of Fairy Martins about; 15th August, building.

The nest of this species is a retort-shaped structure, outwardly formed of pellets of mud and lined inside with dried grasses and feathers. Usually they are built close together, sometimes evenly in rows, but frequently in clusters, the entrances of many alone being visible. When resorting to hollow tree trunks I have known of several instances of the entrances being entirely closed up by fresh builders. On the rocky banks of the Upper Clarence River I found their nests built regularly in single rows of ten or a dozen, with an odd nest of the Welcome Swallow (*Hirundo neoxena*) here and there in a crevice, on which the bird was sitting. In November, 1897, I observed hundreds of the nests of the Fairy Martin attached to the hard and sun-dried banks of the Gwydir and Mehi Rivers. About the western suburbs of Sydney, these birds nest regularly every season under the eaves of houses. Woolsheds, stables and underneath culverts and bridges are also favourite nesting sites. The upper portion of the stone piers of the old railway bridge, which crosses the Nepean River at Penrith, was a compact mass covered with the nests of this species; they are exceedingly common, too, under the river banks about Norton's Basin. The nests vary exceedingly in size, according to the position in which they are built, but the bottle-neck-like entrance almost invariably points in a horizontal position, or downwards, although it may be turned to one side. An average straight-necked nest measures, externally over all, ten inches in length by six inches in breadth and four inches in depth. Where nests have been built favorable for observation, principally isolated ones under the eaves of a house selected as a fresh nesting site, I have always noted that each nest was constructed by a single pair of birds. This I have verified by observations extending over a period of many years. If undisturbed, some of the old nests are used the following season, but new ones are added every year. It is remarkable the persistency with which they keep on building when once they have

settled on a nesting site. Under a verandah I have known a colony to keep on building for nearly a fortnight, although their barely commenced structures were regularly removed by the resident of the house every day.

For the second brood new nests are frequently constructed at the latter end of November, underneath the old ones, apparently built by the same birds in August. At Ashfield I once observed a number of Fairy Martins partially build their nests under the eaves of a house, then abandon them, and build fresh nests on the opposite side. Frequently a community of these birds are ousted from their newly completed nests by the introduced House Sparrow (*Passer domesticus*). Inland, too, their disused nests are often utilized by the Striated Diamond-bird (*Pardalotus ornatus*).

The accompanying plate of nests of the Fairy Martin is reproduced from a photograph, taken under a bank of the Bell River, near Wellington, New South Wales.



NESTS OF THE FAIRY MARTIN.

Writing of this species the late Mr. K. H. Bennett remarks:—"Under the verandah of the homestead at Yandembah a great number of the nests of the Fairy Martin were clustered together. One day I observed a pair of Red-backed Kingfishers (*Halcyon pyrrhopygius*) perched on one of the rustic branches attached to the verandah posts. Curious to know what was their object in coming to such an unusual place I sat down and watched them. Presently one of the Kingfishers flew up to a Martin's nest, and clinging to its roughened sides proceeded to break off the neck, piece by piece, until tired with the exertion, when the other took its place. This continued until the whole of the neck was broken away, and the eggs or young birds could be reached, which were speedily withdrawn and devoured. The Kingfishers repeated this operation every day for several weeks."

At Coonamble, in October 1905, I found a number of nests attached near the ground to the underside of a large gum tree. The birds had probably selected this site owing to the proximity of water, from a recent rainfall, but which had nearly dried up at the time of my visit. The old birds were busy feeding young ones. Passing that way a few days later I was surprised to find about twelve of the nests had been broken into, and some partially devoured young ones mixed up with the remains of the mud walls of the nests and feathers lying on the ground. I believe the nests had been rifled by a Raven, whose nest was in a tree close by, although a Red-rumped Kingfisher had been shot in the vicinity of them a few days before.

Mr. Thos. P. Austin sends me the following notes from Cobborah Station, Cobborah, New South Wales:—" *Petrochelidon ariel*, like *P. nigricans*, arrives in very large numbers during the spring. They soon set to work upon nest-building in any convenient place, such as within a partly burnt out large tree, beneath large logs, under bridges, but more often under over-hanging banks of rivers and creeks, where their nests are to be seen in large clusters. Amongst the smaller birds of Australia, I know of none the eggs of which vary so much in both shape and colour; the clutch usually consists of three or four, and frequently no two eggs in the same clutch will be alike; they vary from pure white and almost round, to heavily freckled and blotched long-shaped oval. At times the complete clutch of four eggs will be pure white, without a freckle at all."

The eggs are usually four or five in number, oval or elongate in form, although slightly pyriform specimens are sometimes found, the shell being close-grained, smooth and slightly lustrous. They are dull white, some specimens being entirely devoid of markings, but as a rule they are finely freckled, with yellowish or very faint reddish-brown, particularly on the larger end, where in some specimens they form irregular zones. Others have the markings uniformly distributed over the shell. A set of five measures:—Length (A) 0.73 × 0.46 inches; (B) 0.77 × 0.5 inches; (C) 0.76 × 0.48 inches; (D) 0.73 × 0.48 inches; (E) 0.77 × 0.51 inches. A set of four measures:—Length (A) 0.68 × 0.47 inches; (B) 0.67 × 0.5 inches; (C) 0.68 × 0.5 inches; (D) 0.7 × 0.49 inches.

Fledgelings resemble the adult, but are duller in colour; the feathers on the back are dark brown with a slight metallic lustre, and the scapulars and secondaries are margined around the tips with rufous. Wing 2.6 inches.

Near Sydney nidification usually commences in August, and generally occupies about fifteen to twenty days. Owing to the narrow entrances to the nests it is impossible to tell when the eggs are deposited, or how long the period of incubation lasts, but I have observed the young ones leave the nest about a month after the old birds commenced to sit. Two broods are reared during the breeding season, which usually continues until the end of February. At Ashfield, on the 25th March, 1895, I caught a fledgeling which had just left the nest; this, however, was exceptionally late.

Family ARTAMIDÆ.

Genus ARTAMUS, Vieillot.

Artamus tenebrosus.

DUSKY WOOD SWALLOW.

Turdus tenebrosus, Lath., Ind., Orn., Suppl., p. xlii. (1801).

Turdus sordidus, Lath., Ind., Orn., Suppl., p. xliii. (1801).

Artamus sordidus, Gould, Bds. Austr., fol. Vol. II., pl. 27 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 143 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 19 (1890); *id.*, Hand-list Bds., Vol. IV., p. 262 (1903).

ADULT MALE—General colour above and below smoky vinous-grey, passing into a chocolate-brown on the lower back, rump, lower abdomen and flanks; the upper tail-coverts darker; quills slaty-black, the second, third and fourth primaries externally margined with white; two central tail-feathers black, the remainder black broadly tipped with white, except the outermost feather on either side, which has

only the tip of the inner web white; feathers at the base of the bill and in front of the eyes dusky-brown; under tail-coverts black; bill blue, black at the tip; legs and feet dark mealy-grey; iris dark-brown. Total length in the flesh 7.3 inches, wing 5, central tail feathers 2.9, bill 0.6, tarsus 0.75.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Queensland, New South Wales, Victoria, South Australia, Western Australia, Tasmania.

THE different species of Wood Swallows found in Australia rank foremost among the exclusively insectivorous birds who assist to keep in check an undue increase of injurious insects, and who also, when opportunity offers, prey to a certain extent on useful insects. Appearing, as some of these species do, in immense flocks they are of inestimable value to farmers and orchardists in ridding grass-lands and fruit trees of insect pests, but to apiarists some species are a perfect scourge, for when they take up their residence near bee farms they destroy large numbers of these useful and industrious insects. By some vigneron and orchardists this is not considered a serious offence, for they assert that bees frequently pierce grapes, apricots and other soft fruits, forgetting at the time, even if true, how useful these insects are in effecting the fertilisation of flowers and fruits by conveying the pollen from one blossom to another while engaged in their search for honey. The fact, however, must not be overlooked that some insectivorous birds will prey as readily upon the useful



DUSKY WOOD SWALLOW.

Scale-eating Moth (*Thalpocharis cocophaga*) as the destructive Maize Moth (*Heliethris armigera*), or the Codlin Moth (*Carpocapsa pomonella*). Unfortunately the injurious insects which farmers and orchardists have to contend with far outnumber those which may be considered friendly to their interests. It is, therefore, to insectivorous birds they must look for assistance to keep their numbers in check. Wood Swallows deserve to be protected for the number of noxious insects they destroy every

year, but at the same time the apiarist cannot be blamed for shooting them when they feast upon his bees.

One of the most widely distributed species of the genus *Artamus* is the well known Dusky Wood Swallow. With the exception of the northern and north-western portions of the continent it is found in most parts of Australia, and it likewise inhabits Tasmania. In Eastern Australia it is a partial migrant, being more abundantly distributed during the spring and summer months, and gives preference to open forest and partially cleared lands near the coast, than the dry inland districts. It frequents also orchards and gardens, and may be often seen on the top of a fence or near the end of a dead branch.

Its food consists principally of flies, grasshoppers and small beetles. Portion of its time it passes on the wing, but probably the greater portion of its prey is secured near the ground. It is most destructive to bees. At Cronulla Beach I watched for some time several of these birds perched on a dead tree above a hive, dashing down every minute or two and catching a bee, presumably on its return to the hive. At Roseville on the 26th January, 1909, I shot six of these birds, a pair of adults and four young ones, who were devastating an apiary, the owner of which informed me that the old birds always brought their young ones and fed them on bees. I found

their stomachs literally gorged with these industrious insects. Similar evidence I found in the stomachs of three birds obtained by Mr. R. Etheridge, the Curator, at Colo Vale, on the 8th December, 1894, who informed me that apiarists in that district had in many instances lost nearly all their bees through the depredations of this species.* At Burwood I saw a small flock of these birds picking up something on the road side near the railway line. As they were there when I repassed an hour later, I had the curiosity to look what it was they were feasting upon, and found it to be a piece of boiled sausage meat, probably the remains of some carter's lunch.

Mr. E. Tipper writes me as follows, from West Maitland, New South Wales, under date 18th July, 1896:—"Mr. James Anderson last week shot over forty Dusky Wood Swallows, near Hexham, the stomachs of some few of them that were examined being full of bees captured close to his apiary."

At night, except during the breeding season, these birds have a curious habit of hanging together in clusters like a swarm of bees, sometimes selecting the hollow trunk of a tree for the purpose; but just as often the inner birds cling to the roughened bark at the juncture of a thick forked limb. At Dobroyde I have noted this habit frequently just before dusk.

Mr. H. L. White, of Belltrees, Scone, New South Wales, writes me as follows:—" *Artamus sordidus* is resident here and an early breeder, the nests being usually placed in much safer positions than those of *A. superciliosus*. As a rule not more than a pair are to be seen together, but they are distributed in fair numbers all over the Upper Hunter District. Settlement does not appear to disturb the bird, which is always to be seen in local farms and gardens, where it does a great amount of good by destroying grubs, moths, grasshoppers, etc. I look upon the family *Artamidae* as being amongst our most useful native birds."

Mr. Thos. P. Austin sends me the following notes from Cobborah Station, Cobbara, New South Wales:—"A few examples of *Artamus sordidus* remain in this district throughout the year, though they are to be seen in much greater numbers during the spring. Only once have I been privileged to see these birds clustered together; so closely were they packed that there appeared to be not more than from a dozen to twenty of them, but when I disturbed them I could see there must have been fully fifty. This was upon a very cold day during August, 1908, and just as a storm was approaching. This species was always very plentiful in the Geelong District, Victoria, during the spring, and used to breed there in great numbers. Like *A. superciliosus* and *A. personatus* it is a very valuable insect destroyer, but unfortunately is not found in such large flocks.

From Blackwood, South Australia, Mr. Edwin Ashby sends me the following note:—" *Artamus sordidus* is more or less with us in the Adelaide Hills at all seasons, though in the depth of winter it is sometimes not seen for several weeks together. At times during the winter flocks of this species visit the Adelaide Plains, probably for warmth. In the autumn and spring, on very cold mornings, the birds crowd together on lofty boughs of gums in great bunches, a dozen or more in a bunch. They look like great nests. I have seen as many as three separate bunches on a single bough."

Dr. A. M. Morgan sends me the following note from Adelaide:—" *Artamus sordidus* is found in all parts of South Australia I have visited, and breeds from September until the end of December. At Laura they were very familiar birds, and have built in my garden there, and have attempted to breed in the trees lining the streets, but the nests were always taken by the boys of the town. In South Australia the eggs are almost invariably three in number, sometimes only two, and I do not remember ever having taken four."

From Melbourne Mr. G. A. Keartland writes me:—"It is not generally known that *Artamus sordidus* indulges in song. Whilst visiting the Werribee District with Mr. J. Gabriel we were enjoying a rest under the shade of a *Casuarina*, when a Sordid Wood Swallow perched on the

* North, Insectivorous Birds of N. S. Wales, "Agric. Gaz. N. S. Wales," p. 384 [1896].

next tree, and for about twenty minutes kept up a most beautiful song. Its notes were not very loud, but had a great range, and harmonised well. They rear two broods in the season."

The nest is a cup-shaped structure, externally formed of thin twigs and lined inside with rootlets or grasses, and in some instances with horse-hair. An average one measures outwardly four inches and a half in diameter, by two inches and three-quarters in depth, and the inner cup two inches and a half in diameter by one inch and a half in depth. It is usually built in a thick forked branch of a tree, or held in position by a projecting piece of bark on the side of a tree, or hidden by a bunch of short leafy twigs growing on the side of a branch, at a height varying from three or four to forty feet from the ground. The nest here figured was built in a mistletoe, on a gum tree at Chatswood, and was taken by Mr. A. A. Johnston on the 1st December, 1899. At Roseville I found a nest containing four nearly fledged young on the 3rd October, 1898. It was built in the fork of a *Melaleuca*, five feet from the ground. The nests of

this species may be found fairly common between the months of September and January.



NEST AND EGGS OF DUSKY WOOD SWALLOW.

The eggs are usually three, sometimes four, in number for a sitting, oval or rounded oval in form, the shell being close-grained, smooth and slightly lustrous. They vary in ground colour from almost pure white to, in rare instances, a creamy white, and are spotted and blotched with varying shades of brown, black and grey, the markings predominating in some instances at the thicker end, where they form a more or less well-defined zone; others have the markings more uniformly distributed over the surface of the shell. A set of three, taken at Canterbury on the 4th September, 1893, measures:—Length (A) 0.9×0.7 inches; (B) 0.91×0.7 inches; (C) 0.89×0.71 inches. A set of four taken at Chatswood on the 5th December, 1899, measures:—Length (A) 0.88×0.68 inches; (B) 0.87×0.66 inches; (C) 0.88×0.67 inches; (D) 0.9×0.7 inches. A set of three, taken by the Rev. H. B. Atkinson, on the 13th November, 1889, at Circular Head, on the North-western coast of Tasmania, measures:—Length (A) 0.9×0.67 inches; (B) 0.85×0.67 inches; (C) 0.87×0.65 inches.

A nest of the Dusky Wood Swallow I found at Belmore on the 14th October, 1896, in addition to two eggs of this species also contained an egg of the Pallid Cuckoo.

Young birds are smoky-brown above and below, with ashy-white streaks to all the feathers, broader and not so clearly defined on the under surface, which is also paler; wings and tail as in the adult, but some of the upper wing-coverts are centred with brown or brownish-white at their tips, and the primaries narrowly edged with ashy-white around their tips. Wing 4.5 inches.

September and the four following months constitute the usual breeding season of this species in Eastern Australia.

Artamus leucogaster.

WHITE-RUMPED WOOD SWALLOW.

Ocypterus leucogaster, Valenc., Mém. Mus. d'Hist., VI., p. 21, pl. VII., fig. 2 (1820).*Artamus leucopygialis*, Gould, Proc. Zool. Soc., 1842, p. 17, *id.*, Bds. Aust., fol., Vol. II., pl. 33 (1848), *id.*, Handbk. Bds. Austr., Vol. I., p. 154 (1865).*Artamus leucogaster*, Sharpe, Cat. Bds. Brit. Mus., Vol. XI., p. 3, (1890), *id.*, Handl. Bds., Vol. IV., p. 260 (1903).

ADULT MALE—General colour above light chocolate-brown with a slaty-grey wash in the lower back : rump and upper tail-coverts white ; wings dark slate colour, with a blackish wash which is more pronounced on the outer-series of the upper wing-coverts and the outer webs and tips of the primaries ; tail feathers greyish-black, darker on their outer webs ; head and neck dark slaty-grey ; base of the bill and lores blackish ; foreneck, breast, abdomen, under wing and under tail-coverts white ; bill pale blue, blackish at the tip ; legs and feet slate colour ; iris dark brown. Total length in the flesh 7·4 inches ; wing 5·3, tail 2·5, bill 0·7, tarsus 0·73.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Western Australia.



WHITE-RUMPED WOOD SWALLOW.

THE White-rumped Wood Swallow is widely distributed over the greater portion of the Australian Continent. It is common in Queensland and in the northern coastal districts of New South Wales, but is not found in the southern coastal districts of the latter State, or in the extreme southern portions of the continent. I obtained specimens at Coonamble, in the Central District of New South Wales, where it is by no means common, and in fact, with the exception of *Artamus minor*, which I have never met with, it may be regarded as the rarest species in the north-western portions of the State.

Stomachs of specimens examined contained the remains of insects, principally beetles, but as will be seen by Mr. Savidge's notes, it is also a great destroyer of bees.

Mr. Thos. P. Austin writes me as follows from Cobborah Station, Cobbora, New South Wales :—" *Artamus leucogaster* I saw for the first time during the second week of October, 1907, from the balcony of an hotel at which I was staying in the town of Cairns, North-eastern Queensland. Several pairs were perched upon a telegraph wire, and were continually diving down after insects, which they secured, and would then return to the side of their mates. During the following month I saw many of these beautiful birds breeding upon the islands off the coast at Mackay. Perhaps there are but few birds in Australia which more readily betray the situation of their nests. If approached when sitting, they will fly away uttering a plaintive note, but will almost immediately return to their nests. I noticed the nests situated in a variety of places, but on the islands the most favoured situation was among the leaves of a *Pandanus* tree."

Mr. G. A. Keartland, of Melbourne, sends me the following note :—" During my stay at the Fitzroy River, Western Kimberley, North-western Australia, from November, 1896, to March, 1897, I frequently saw *Artamus leucogaster* near the swamps or river. They were either

in pairs or family groups, consisting of parents and young. They seem to be the most affectionate species of the genus. When not engaged in securing food they were perched side by side preening each others feathers. It is a pretty sight to see a family of these birds perched on a dry twig, their beautiful white breasts contrasting with the leaden grey of their heads, necks and backs. I never noticed them in flocks, but on several occasions found them perched on the same tree as a pair with the Black-faced Wood Swallow. I was informed that they remained in the same neighbourhood throughout the year."

The following information is extracted from notes made by Mr. F. L. Whitlock, while collecting in North-western Australia, in 1908, on behalf of Mr. H. L. White, of Belltrees, Scone, New South Wales:—" *Artamus leucogaster* breeds on the Lower De Grey River, and more commonly in the mangroves at Condon, on the coast. On the De Grey I had a nest under observation near one of my camping places; it was in a cavity of a gum tree, at a height of about twenty-five feet, and contained young birds. At Condon I found half-a-dozen or more nests in the mangroves, most of them containing young a day or two old; I got, however, two nests with eggs, and an addled egg in a third nest. The usual situation for the nest was in the topmost fork of the highest mangrove in the immediate neighbourhood. They are easily located, as the male was generally perched near at hand, and on my approach he gave vent to a harsh alarm note, to which the female usually responded, and slipped off her nest. The nests, as a rule, had a more substantial foundation than those of other Wood Swallows with which I am acquainted."

Writing on the birds of the Cloncurry District, Northern Queensland, Dr. W. Macgillivray sends me the following note:—" *Artamus personatus*, *A. superciliosus*, *A. leucopygialis* and *A. minor* are all fairly numerous, especially during the wet season, early in the year, and on into the winter. *A. leucopygialis* usually builds in the spout of a tree."

While resident in the Herbert River District, North-eastern Queensland, Mr. J. A. Boyd wrote me as follows:—" On the 1st November, 1893, I found a nest of the Magpie Lark (*Grallina picata*) at Goose Lagoon; it was placed in a triple horizontal fork of a Leichhardt tree, some eight feet from the ground. Sitting on the edge of the nest was a White-rumped Wood Swallow, which I thought was only resting there, and getting hold of the drooping end of the limb I tried to pull the nest down, but could only get it low enough to put my fingers on the rim. Failing to touch the bottom of the nest, I pushed it off, and caught it as it fell, and to my surprise I found that the nest had been relined at the bottom with grass, and contained five young Wood Swallows."

Mr. H. V. Foster, writing to me from the Rous Sugar Mill, Richmond River, New South Wales, remarks:—" I took a nest of *Artamus leucogaster* from the fork of a Tea-tree on the 5th November, 1900; the same year I saw a pair of these birds building in the trunk of a Bean-tree fully eighty feet from the ground, and saw another pair feeding young ones in the trunk of a gum tree, about thirty feet from the ground. The latter nest was built in a niche where a piece had been split out near the top."

From Copmanhurst, on the Clarence River, Mr. George Savidge sends me the following note:—" *Artamus leucogaster* is the commonest species of Wood Swallow here, but the eggs are very difficult to get, as they usually build in the rotten dead limbs of the old ring-barked gums, and placed very high up, in any crevice or hole. One nest I found was built in an old nest of *Grallina picata*, and contained four eggs. It is a migratory species, arriving here early in September and departs about March. This species is a great bee-eater; some I shot on the 22nd April, 1905, were full of bees. A flock of thirty or forty used to alight on the telegraph wire close to my apiary, and would soon have caused great havoc if not driven away. Another species, *Artamus superciliosus*, came here about the end of last winter in great numbers, but they did not stay long."

Mr. Frank Hislop writes me:—"In the Bloomfield River District, North-eastern Queensland, the White-rumped Wood Swallow is only found in the open forest lands. These birds come in great numbers about a bush fire, and often fly right down in front of the flames after insects. They build a nearly flat nest, as a rule composed of She-oak leaves, in a hollow or cleft in a tree, and lay three or four eggs."

From Duaringa, Dawson River, Queensland, Mr. W. B. Barnard sends me the following note:—" *Artamus leucogaster* usually builds a nest of dried grasses and rootlets in a hole of a tree, but I have also found them inside old nests of *Grallina picata*. They lay three or four eggs for a sitting. I have also found the egg of the Pallid Cuckoo in the nest of the White-rumped Wood Swallow."

The nest is an open cup-shaped structure formed of dried grasses, and varies in size according to the position in which it is built. It is remarkable that in Queensland and in the northern coastal districts of New South Wales, it is more frequently built in the fork of a dead tree, or in a hollow spout, while occasionally this species re-lines the deserted nest of the Magpie Lark (*Grallina picata*). In the central districts of New South Wales the disused nest of the latter species is more frequently appropriated than is a new nest constructed by the Wood Swallows.

The eggs are three or four for a sitting, usually the latter; the only instance in which I have known this number to be exceeded is that referred to by Mr. Boyd, when he found five young Wood Swallows in an old nest of the Magpie Lark. The eggs are oval in form, some specimens being sharply pointed towards the smaller end, the shell being close-grained, smooth and almost lustreless. Typically they are of a dull white ground colour, which is spotted and blotched with pale brown, yellowish-brown and nearly obsolete markings of faint bluish-grey. Others are almost pure white, and have the markings more distinct; in all they predominate, as a rule, or are almost entirely confined to the larger end, where often they are confluent and assume the form of an irregular zone. A set of three taken at Merungle on the 19th November, 1892, measures:—Length (A) 0.95 × 0.68 inches; (B) 0.93 × 0.68 inches; (C) 0.93 × 0.67 inches. A set of four taken at Narrabri on the 27th October, 1890, measures:—Length (A) 0.9 × 0.63 inches; (B) 0.92 × 0.64 inches; (C) 0.91 × 0.62 inches; (D) 0.89 × 0.63 inches.

Fledgelings resemble the adults, but are more of a dusky-brown above, the base of the forehead, the feathers of the mantle and back, the upper wing-coverts and scapulars being conspicuously tipped with pale brown, and the primaries and tail feathers with buffy-white; under surface dull white, the feathers at the base of the lower mandible and the cheeks blackish, the fore-neck being crossed with an indistinct band of pale brown. Wing 3 inches.

Immature birds have a chocolate-brown wash, the feathers on the crown of the head, the throat and sides of the neck are dusky-brown, and some of the feathers on the centre of the throat are dull white. Wing 3.2 inches.

September and the three following months constitute the breeding season of this species in Eastern Australia.

Artamus superciliosus.

WHITE-EYEBROWED WOOD SWALLOW.

Ocypterus superciliosus, Gould, Proc. Zool. Soc., 1836, p. 142.

Artamus superciliosus, Gould, Bds. Austr., fol., Vol. II., pl. 32 (1848); *id.* Handbk. Bds. Austr., Vol. I., p. 152 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 15 (1890); *id.* Handb. Bds., p. 261 (1903).

ADULT MALE—General colour above slaty-grey with a dusky wash on the head, mantle and back; tail feathers ashy-grey tipped with white; forehead, lores and sides of face black; above the eye a broad white stripe; throat blackish-grey, the lower portion dark slaty-grey, remainder of the under surface vinous-chestnut, becoming slightly paler on the under tail-coverts: bill light blue, black at tip; legs and feet dark bluish-black; iris black. Total length in the flesh 8 inches, wing 5, tail 3.2, bill 0.75, tarsus 0.8.

ADULT FEMALE—Differs from the male in having only a slight indication of the white eyebrow; the lores and feathers around the eye black; the entire throat and sides of the neck slaty-grey, and the breast, abdomen and under tail-coverts pale vinous-chestnut.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Western Australia.

THE White-eyebrowed Wood Swallow is a strictly migratory species to the south-eastern portions of the continent, arriving in the coastal districts generally during the month of October, and departing again after the breeding season is over at the end of January. It is, however, irregular in its visits, occurring, perhaps, several seasons in succession, and then being absent again for years. Usually this species is accompanied by *Artamus personatus*, and the two species may be found nesting in the same tree. Inland I have always observed the two species in company with one another.

For a period of nine years I had not observed the White-eyebrowed Wood Swallow in the neighbourhood of Sydney, but in October, 1895, it appeared in large numbers in company with *Artamus personatus*, breeding freely about Ashfield, Canterbury and Belmore, New South Wales, and in the following month I observed both species breeding around Melbourne, Victoria, but the latter species was less numerous than the former. While previously resident in Melbourne, I noted that *Artamus superciliosus* always appeared in large numbers during a period of severe drought inland, where it is locally known as "Summer Bird." Since 1895 this species has visited the western suburbs of Sydney, but in comparatively limited numbers, nearly every season; it is remarkable, however, that it does not occur in the coastal suburbs, and only once have I noted a flock flying over Roseville. Open forest and well-grassed lands, studded here and there with wide-spreading *Eucalypti*, are its favorite haunts, although it may be found frequenting and breeding in public and private gardens.

It utters an oft-repeated sweet and clear whistling-note, and the sound produced by a large flock of these birds on the wing, enables one to easily recognise the species again, although it may not have been heard for many years.

Insects of various kinds, and their larvæ, constitute the food of this species. So far as my experience goes, it is not an inveterate bee destroyer like *Artamus sordidus*. On the 1st January, 1897, in Goodlet's Bush, I saw an adult male chase and capture with outstretched claws, a large *Cicada*. It flew about with the insect in its claws, the latter emitting all the time its shrill note. The Wood Swallow descended to the ground several times, on each occasion giving the insect a few vigorous pecks, and at last succeeded in killing it.

Mr. H. L. White, of Belltrees, Scone, New South Wales, has kindly sent me the following notes:—" *Artamus superciliosus* has been noted, for many years, to arrive here during October, breeding operations being in full swing all through November and into December, migration taking place in the early autumn. The choice of a nesting site appears to be a matter of perfect indifference, the most exposed positions being frequently selected. In 1907 swarms of the birds visited us, and nests were met with almost anywhere, stumps, mortice or knot holes in posts, shrubs and fruit trees in gardens, in fact wherever it was possible to place a nest. As far as building and laying was concerned the presence of traffic made no difference, but a noticeable peculiarity was that the eggs were usually deserted when the sitting bird was much disturbed in

the more public and exposed positions. Of the exposed sites selected for nests may be quoted—the cross-bar of a daily used stockyard gate, scaffold poles round a new building, rosebush within a foot of garden path used every half hour, upright on wire suspension bridge where thousands of sheep crossed during the week, mortice holes in a gate post on an hourly used track. However, the favourite haunt of *A. superciliosus* while in this locality is along the banks of the river, where the tall and spreading *Casuarina* makes a fairly secure nesting place. In the breeding season the bird is very noisy and pugnacious, attempting to drive off all other birds from the vicinity of its young. During the summer of 1907 a pair of young Laughing Jackasses, being reared in the garden here as pets, were fed regularly by their parents upon half-fledged Wood Swallows, sometimes as many as six per day being used for this purpose."

Writing me from Glanmire, near Bathurst, New South Wales, Mr. A. E. Ivatt remarks:—"I saw a large flock of *Artamus superciliosus* and *A. personatus*, which contained five hundred or more birds; they stayed here one day, and then disappeared. On three occasions I saw large flocks of these birds during December, 1896, passing towards the north."

From Cobborah Station, Cobborah, New South Wales, Mr. Thos. P. Austin sends me the following notes:—" *Artamus superciliosus* is a migratory species in this district, arriving during spring in flocks of thousands and accompanied by *A. personatus*. The only difference in their habits is that the latter seldom breeds here. Of all the many useful birds we have in Australia, with the exception of *Carphibis spinicollis*, I must give first place to these beautiful little creatures. Just when large patches of grasshoppers are spreading away from where they have lately been hatched, down come large flocks of these birds, and the number of grasshoppers destroyed by them each day must be very many millions, consequently this great pest is kept in check by our little friends far more than the average man upon the land realizes. When these two species are travelling from one district to another, they appear to fly at a great height; often upon a calm day in the early spring have I heard their familiar notes, and could only just distinguish large flocks overhead."

At Yandambah Station, near Booligal, New South Wales, the late Mr. K. H. Bennett noted the arrival of large flocks of *Artamus superciliosus* in company with *A. personatus*, on the 23rd August, 1889, a most unusual time, also accompanied by a few *A. sordidus*, a species at all times rare in the district.

From Broken Hill, South-western New South Wales, Dr. W. Macgillivray writes me:—"Did you notice that some one was trying to divide the migratory birds *Artamus personatus* and *A. superciliosus* which he found breeding in the Alexandra District, in the Northern Territory of South Australia, which is not far from Cloncurry, just across the border of Northern Queensland, into sub-species? Both of these essentially migratory species cannot be influenced by local conditions, for I take it that the birds of these two species shot at Alexandra would be the same as birds that migrate down to New South Wales and Victoria, because they move from north to south every year. Their movements certainly depend upon the seasons, still they always migrate, whereas I do not think that *Artamus melanops* ever does; nor is it gregarious like the other two species mentioned. Much has to be settled yet as to the northern limits of the migratory movements of *A. superciliosus* and *A. personatus*."

With a large series of these birds before me, I quite agree with Dr. Macgillivray that the separation was unnecessary; also those from *A. melanops* and of *Ptilotis sonora*.² The latter agrees precisely in colour and measurements with a bird I shot at Moree, in Northern New South Wales. As I have frequently pointed out, many birds from the hot and arid districts of Northern Australia have a bleached and washed out appearance compared with specimens from Southern Australia.

² "Ibis," 1907, pp. 409-10, 412.

From Melbourne Mr. G. A. Keartland sends me the following notes :—“*Artamus superciliosus* is an occasional visitor to this district, generally arriving in flocks about November. It is regarded as the harbinger of a hot summer. Immediately they arrive they commence building their nests, which are placed in all sorts of trees and bushes, or even on top of a stump or post. During their stay they render valuable service to the orchardist by destroying vast quantities of grasshoppers, moths and other insects. Soon after the young ones are strong enough, they assemble in a large flock and migrate northwards. Sometimes we do not see them for five or six years, but occasionally they come two years in succession. In September, 1896, in the Great Desert of North Western Australia, I saw immense flocks of these birds, sometimes by themselves, and sometimes in company with *A. personatus*, migrating southwards. At Brockman's Creek, Western Australia, where we stayed a month, a patch of scrub near our camp was occupied by three species, *Artamus superciliosus*, *A. melanops* and *A. personatus*.”

From South Australia Mr. Edwin Ashby sends me the following notes :—“*Artamus superciliosus* is an irregular visitor to the neighbourhood of Adelaide, but when it does arrive it is always in company with *A. personatus*. They appeared in large numbers round Blackwood on September 14th, 1907, a very hot north-windy day, and were hawking for insects in hundreds, perhaps one might be within the mark in saying thousands. Three days later they had all disappeared, and turned up again in considerable numbers at the end of October, when they commenced nesting in real earnest. At the present time I know of several nests in which the young are almost fledged. Some nests are in most exposed positions; one just outside my fence is in a gum sapling with only a few tufts of leaves, nest four feet from the ground. One year, when the above species were absent from the neighbourhood of Adelaide, I met with them nesting two hundred miles north of Nackara, on the Broken Hill line. It would be most interesting to find out their movements when absent from our district.”

The nest is irregularly formed externally of thin twigs, the inside, which is cup-shaped consisting chiefly of wiry rootlets, pliant plant stems, and dead grass stems, the materials varying according to the locality in which it is found. An average nest measures externally four inches and a half in diameter by two inches and three-quarters in depth, and the inner cup two inches and a half in diameter by one inch and a half in depth. Little or no preference is shown in the selection of a nesting site; frequently the nest is placed at the junction of a horizontal or upright fork of a tree, within a few feet of the ground; between a piece of loose bark and the trunk of a tree, or in the mortice hole of a gate post. I have also found them on the top of the broad flat fronds of the Norfolk Island Pines, in rose bushes, fruit trees, grape vines, and in many kinds of native and acclimatised shrubs.

The eggs are usually two or three in number for a sitting, although at Moree, in November 1897, only a single egg was deposited in most of the nests I examined. One of the latter I had under observation, only a few feet from my window, was lined entirely with green clover leaves, and the single egg it contained was sat upon during the greater part of the day by the male, who, I have frequently observed, more than takes his share in the duties of incubation. The eggs are oval, rounded oval, or elongate oval in form, the shell being close-grained, smooth and slightly lustrous. In ground colour they vary from a white-brown to a light greenish-grey, which is spotted and blotched with pale umber, and a few underlying markings of slaty-grey, principally upon the larger end, where in some instances they form well-defined bands of confluent markings. A set of three taken at Canterbury measures:—Length (A) 0.92 × 0.68 inches; (B) 0.9 × 0.68 inches; (C) 0.9 × 0.7 inches. A set of two, taken at Belmore on the 15th November, 1895, measures:—Length (A) 0.86 × 0.67 inches; (B) 0.85 × 0.67 inches.

A set of three taken by Mr. Dean Swift, at Belmore, on the 1st December, 1899, also contained an egg of the Rufous-tailed Bronze Cuckoo, *Lamprocoptes basalis*. This is an unusual

instance, for as a rule Cuckoo's deposit their eggs in the nest of those species laying similar or smaller-sized eggs than their own, and seldom is the full complement of eggs found in a nest in which a Cuckoo's egg is deposited.

The White-eyebrowed Wood Swallow commences to build according to the time of its arrival; in the neighbourhood of Sydney it is usually at the latter end of October or early in November, nests with eggs being more often found during the latter month. At Narrabri, Moree and other northern parts of the State, I have found it building at the same time of the year as it does close to the metropolis. Over five hundred miles farther south, near Melbourne, I found it building freely in November, 1895. January may be regarded as the end of the breeding season, for as a rule, near Sydney, the birds depart with their young during the latter end of that month or early in February.

At a meeting of the Linnean Society of New South Wales, held on the 28th October, 1908, I exhibited a hybrid adult male of *Artamus superciliosus* × *A. personatus*, obtained by Mr. H. Greensill Barnard, of Bimbi, Duaringa, Queensland, on the 9th September, 1908. It resembles *Artamus superciliosus* on the upper parts, has the foreneck, lores, cheeks, ear-coverts and throat black, passing into blackish-grey; remainder of the under surface ashy-grey with a slight vinous wash; under tail-coverts pale ashy-grey; over and behind the eye a distinct white superciliary stripe, but not extending so far on to the sides of the crown of the head as in *A. superciliosus*. Total length 7 inches; wing 4.85 inches. Mr. Barnard came across a flock of *A. superciliosus* nesting about five miles away from his home, and among them was this hybrid, which was mated to a female of *A. superciliosus*, engaged in building a nest.

Artamus personatus.

MASKED WOOD SWALLOW.

Ocypterus personatus, Gould, Proc. Zool. Soc., 1840, p. 149.

Artamus personatus, Gould, Bds. Austr., fol., Vol. II., pl. 31 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 150; Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 16 (1890); *id.*, Handl. Bds., Vol. IV., p. 261 (1903).

ADULT MALE—General colour above dark grey, becoming paler on the rump and upper tail-coverts; quills dark grey, narrowly edged with pale buffy-white around the ends, the primaries having a blackish wash towards the tips; tail feathers grey with an irregular band of white at the tip; forehead blackish; lores and sides of face black; ear-coverts and throat black, bounded by an indistinct whitish collar; remainder of the under surface delicate grey and passing into almost pure white on the under tail-coverts; bill bluish-grey, black at the tip; legs and feet dark mealy-grey; iris black. Total length in the flesh 8 inches, wing 5, tail 3.1, bill 0.75, tarsus 0.75.

ADULT FEMALE—Resembles the male, but is browner above and below; lores black, the throat, cheeks, and ear-coverts blackish-grey, and an indistinct collar on the lower throat ashy-grey.

Distribution—Queensland, New South Wales, Victoria, South Australia, Western Australia, North-western Australia.

THE Masked Wood Swallow is widely distributed over the greater portion of the Australian Continent, and has been recorded by many writers, except from the extreme northern parts of the Northern Territory of South Australia. It is a regular visitant to the inland portions of New South Wales, arriving about the end of September, frequently in company with *Artamus superciliosus*, and the nests of both species may be often found close together. In November, 1896, at Narrabri and at Moree in the same month of the following year, I found large numbers of the Masked and White-eyebrowed Wood Swallows nesting in almost every conceivable

situation. During the same month both species visited, and remained to breed, in the neighbourhood of Sydney, at Belmore and Canterbury, re-appearing again in the two successive years. Since that time, while the White-eyebrowed Wood Swallow has visited the vicinity of the metropolis, and bred there, I have not observed *Artamus personatus*.

Gould, who originally described *Artamus personatus* in the "Proceedings of the Zoological Society," in 1840, remarks in his Handbook to the Birds of Australia³:—"My knowledge of the range of this species is very limited; a single specimen was sent me from South Australia, while fine examples were killed by Gilbert in the colony of Swan River. In size and structure it more nearly resembles the *Artamus superciliosus* than any other, and the two species form beautiful analogies of each other, one being in all probability confined to the eastern portion of the country and the other to the western." That Gould, during his stay in New South Wales, should miss seeing so common a species is remarkable, and can only be explained by the strictly migratory habits of this Wood Swallow. I have, however, met with it during the late spring months in all the far inland portions of the State I have visited, although it is extremely irregular, and may be absent from the coastal districts for a number of years.

Mr. G. A. Keartland, of Melbourne, sends me the following note:—" *Artamus personatus* was a stranger near Melbourne until recent years, when it has invariably arrived in company with *A. superciliosus*. Its habits are similar. In October, 1896, I saw flocks, consisting of thousands of these birds only, crossing the Great Desert in a southerly direction. Whilst camped for our midday halt a large flock settled on the scrub through which we were travelling, but as soon as their hunger was appeased they renewed their journey. Next day we saw three flocks all going in the same direction."

From Adelaide Dr. A. M. Morgan writes me as follows:—" *Artamus personatus* periodically visits the southern parts of South Australia, arriving about the beginning of September and commencing to nest almost at once, being always accompanied by *A. superciliosus*. They do not come every year as far south as Adelaide, but during the three years I was at Laura they always put in an appearance there. In 1895 I first noted them on the 8th September flying across the Flinders Range, and on the 15th September found the first nest, but they were not in full swing until the end of October, when, in certain parts of the range, there was scarcely a tree without one or two nests in it. On 2nd November, 1895, I found a nest built in the top of an old one of *Collyriocinclla harmonica*, and on 9th November one built in an old nest of *Gymnorhina leuconota*, but most of the nests were either built in the stout fork of a tree, or in the top of a hollow branch. The eggs are two or three in number, generally the former. The birds have a bad name in the country districts as bee destroyers, and I am afraid it is deserved. They came down to Adelaide a few years ago in great numbers, and were building in the trees on the park lands, but very few of them were allowed to hatch their young there. However, they bred freely near the coast, and I saw great numbers of them nesting in the tea-tree at the Grange, about seven or eight miles west of the city, in 1899. I also found them breeding in numbers at the Finnis at the end of October; most of the nests had young birds at that date."

From Western Australia Mr. Charles G. Gibson writes me as follows:—"At Lake Austin in August, 1903, a flock of about thirty *Artamus personatus* arrived about the end of the month, and took up their abode half a mile away from my camp, where there was surface water. They commenced to build almost at once, and on the 2nd September I found two very frail nests, composed of green wiry grass, in low bushes, each containing three fresh eggs. On the 5th September I found another in a very exposed situation, on a broken limb of a dead Mulga bush, also containing three fresh eggs. All three nests were built near one another, and there were probably more, but I had not the spare time to look for them."

³ Handbk. Bds. Aust., Vol. I., p. 150 (1865).

The nest is a cup-shaped structure, irregularly formed externally of thin twigs, and neatly lined inside with fibrous rootlets and grasses, an average one measuring externally four inches and a half in diameter by three inches in depth, and the inner cup two inches and a half in diameter by one inch and a half in depth. They are usually built within a few feet of the ground, in a low bush or sapling, at a height varying from two to ten feet. At Narrabri, in November 1896, I found this species breeding in dead "Belar" trees (*Casuarina glauca*). Some of the nests were in curled pieces of bark, hanging from the under sides of branches, others in thin forks, a few being within hand-reach, while one was at an altitude of fully thirty feet. Most of the nests I have examined in the neighbourhood of Sydney, principally at Belmore and Canterbury, were built low down in gum saplings, tea-trees and turpentine-trees, and were composed chiefly of green grasses.

The eggs are two or three in number for a sitting, oval or thick oval in form, the shell being close-grained, smooth and almost lustreless. They vary from a greyish-white to a light greenish-grey, which is clouded and blotched with varying shades of brown, intermingled in some instances with a few underlying spots of grey. As a rule the markings predominate on the thicker end, where they assume the form of a cap or zone. A set of two taken at Belmore on the 12th November, 1898, measures:—Length (A) 0·87 × 0·67 inches; (B) 0·88 × 0·68 inches. A set of three taken at Narrabri on the 9th November, 1896, measures:—Length (A) 0·83 × 0·66 inches; (B) 0·84 × 0·66 inches; (C) 0·84 × 0·65 inches. The eggs of this species, as a rule, cannot be distinguished from those of the White-eyebrowed Wood Swallow (*Artamus superciliosus*).

October and the two following months constitute the usual breeding season of this species in South-eastern Australia, nests and eggs being more often found in the neighbourhood of Sydney during November and the early part of December; but, near Port Augusta, Dr. Morgan records finding a newly-made nest in September. Near Louth, in Western New South Wales, Mr. Edward Lord Ramsay also found two nests with fresh eggs, one built in the hollow spout of a Box-tree, on the 11th September, and the other in a hollow stump of a broken off Mulga on the 19th September, 1889. In the preceding year he obtained nests with fresh eggs as early as the 28th August. In Western Australia Mr. C. G. Gibson procured fresh eggs also at the end of August.

On one occasion the late Mr. George Barnard, of Coomooboolaroo, Duaringa, Queensland, found the male of *Artamus superciliosus* paired with the female of *A. personatus*.

Artamus melanops.

BLACK-FACED WOOD SWALLOW.

Artamus melanops, Gould, Proc. Zool. Soc., 1865, p. 198; *id.*, Handbk. Bds. Austr., Vol. I., p. 149 (1865); *id.*, Suppl. Bds. Aust., fol., Vol. pl. 7 (1869); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 17 (1890); *id.*, Handl. Bds., Vol. IV., p. 262 (1903).

ADULT MALE—*General colour above brown passing into a greyish-brown on the crown of the head; rump and upper tail-coverts blackish; wings ashy, the quills and greater wing-coverts with paler margins externally, whitish around their tips; two central tail-feathers black, the remainder black largely tipped with white; lores, base of forehead, feathers around the eye, cheeks, chin, and upper throat blackish; remainder of under surface ashy-brown, paler on the foreneck, darker on the abdomen: vent and under tail-coverts black, the latter often narrowly tipped with white; bill bluish horn-colour, blackish at the tip; legs and feet grey; iris brown. Total length in the flesh 7·3 inches; wing 4·9, tail 2·8, bill 0·62, tarsus 0·75.*

ADULT FEMALE—*Similar in plumage to the male, but having the under tail-coverts more broadly edged and tipped with white.*

Distribution—New South Wales, South Australia, Western Australia.

THE Black-faced Wood Swallow is a permanent resident in the western portions of New South Wales. It is a common species, and is met with in pairs or small flocks almost everywhere, and frequently many miles away from timber. Wire fences and telegraph wires crossing the plains are favourite perching places, from which it often sallies forth to capture some passing insect, and return again to the same place. In cold wet weather these birds at night have a habit, similar to other members of the genus, of hanging in clusters on the sheltered side, or in a hollow trunk of a tree.

Stomachs of specimens examined contained only the remains of insects.

One of the most perplexing problems I have attempted to solve, is the separation by any constant character of the three described species of black-faced *Artami* inhabiting Australia. In the large series of specimens now before me from all parts of Australia they frequent, it would be easy to pick out certain specimens typical of each of the described species. According to Dr. R. B. Sharpe in the "Catalogue of Birds in the British Museum,"³ *Artamus cinereus*, Vieillot, is an inhabitant of Western Australia; *A. melanops*, Gould, South Australia; and *A. venustus*, Sharpe, North-western Australia. Two of the characters, however, given for the separation of *A. melanops* from *A. cinereus*, its smaller size and the under tail coverts tipped with white, are of little, if any value. The wing-measurement given of *A. melanops* is 4.9 inches, and that of *A. cinereus* only 4.95 inches. Writing earlier on the genus *Artamus* in Rowley's "Ornithological Miscellany," † Dr. Sharpe remarks: "*Artamus albiventris* is doubtfully distinct from *A. cinereus*, from which *A. melanops*, Gould, will be also with difficulty separated." . . . "*Artamus albiventris* is a species with which I am unacquainted; the only specimen in the museum referred to by the late Mr. G. R. Gray appears to be only *A. cinereus*, with a little more white on the under tail-coverts, possibly a variable character." Of *Artamus melanops* Dr. Sharpe writes: "I am very doubtful about the species, as we have in the Museum two specimens from Cape York, received from Mr. Gould as his *Artamus melanops*, and these two individuals I can hardly separate from *A. cinereus*. They have a little more black on the face and narrower white edgings to the under tail-coverts; this appears to be the best character, but, as I have already hinted, it appears to be somewhat variable. At the same time this species is so little known that perhaps *A. venustus*, nob., may turn out to be only the adult stage."

Not only are the white tips or edgings of the under tail-coverts of the Black-faced *Artami* a variable character, as suggested by Dr. Sharpe, but they are also a sexual one, the female, as a rule, always having a larger amount of white on the under tail-coverts than the male. Of typical adult males of *Artamus melanops* obtained in South Australia, the under tail-coverts are black, or the extreme tips of the longest ones only white; specimens obtained in South-western New South Wales are similar, a few being more broadly edged with white in some examples. Specimens procured at Coonamble vary from the typical *A. melanops* in having the under surface of a distinct ashy-grey, not brown, and the under tail-coverts broadly margined with white. An adult male obtained by me farther to the north-east, at Narrabri, has the basal half of the under tail-coverts black, and the apical half white. This specimen is intermediate between *A. melanops* and *A. albiventris*. An adult male I shot at the nest at Moree, eighty miles farther north, the following year is similar, but the female has the under tail-coverts pure white, and is similar to another specimen in the Australian Museum collection labelled "*Artamus albiventris*, Gulf of Carpentaria, Queensland, Mr. K. Broadbent, 1874." *Artamus melanops* thus appears to completely intergrade with *A. albiventris*. Specimens of the latter from the Dawson River,

³ Cat. Bds. Brit. Mus., Vol. XIII., p. 17 (1890). † Orn. Miscel., Vol. III., pp. 180, 196, 198 (1878).

Herbert River, and Rockingham Bay, Queensland, have the lower portion of the abdomen and the vent also white, like the under tail-coverts, although there are some black feathers on the vent of the specimen from the Gulf of Carpentaria.

Specimens in the collection, and others lent by the Trustees of the South Australian Museum, including the co-type of *Artamus melanops*, Gould, labelled "St. a'Becket's Pool, Lat. 28° 30', 23rd August, 1863," may be distinguished by their paler brown crown, sides of the head, lower throat, foreneck and upper breast. The co-type obtained by Mr. S. White on the same day as the type, does not exhibit the yellowish-brown tinge to the plumage as shown by Gould in the figure of this species in his "Supplement to the Birds of Australia,"* the light eyebrow is not so pronounced, the extent of black on the face, and especially on the throat, more circumscribed, and the under tail-coverts are distinctly margined with white. The sex is not given, but it is apparently a female. Wing 4.7 inches. There is a somewhat similar specimen in the Australian Museum Collection, from Kojonup, Western Australia, labelled "*Artamus cinereus* (young)," but its soft and downy feathers exhibit the unmistakable plumage of immaturity. Wing 4.7 inches. Another specimen from the same locality has the head and under parts more distinctly shaded with grey, and is similar to another specimen from Derby, North-western Australia. The wing measurement of both are alike, 4.7 inches.

Of the specimens in the Australian Museum those agreeing best with Dr. Sharpe's description of *Artamus cinereus*, that is with the less extent of black on the face, were all collected by the late Mr. Alexander Morton at Yam Creek, about one hundred miles inland from Port Darwin.

From Broken Hill, in South-western New South Wales, Dr. W. Macgillivray sends me the following note:—" *Artamus melanops* is our only Wood Swallow; these birds remain throughout the year, and do not flock. A pair will have its own particular locality, and seem to keep to it year after year if the season be favorable. The nest is usually placed in a small shrub or bush, never more than three or four feet from the ground, and is built of small twigs and branchlets, lined with finer material of the same sort. The eggs are three or four in number, placed in a cavity measuring two and a half inches in diameter and one and a half inches in depth. The earliest nest of which I have a note was on the 13th October, and the latest in November.

From South Australia Dr. A. M. Morgan writes me as follows:—" I have not met with *Artamus melanops* south of Port Augusta. It is there the most common species, and breeds freely in all the parts north and west of this place which I have visited. They go about generally in pairs, or small flocks of five or six, and closely resemble *A. sordidus* in their habits and manner of nesting, a common nesting place being the top of a hollow stump or branch. The eggs are usually four in number. I do not know that they have any regular breeding season, but believe they breed when the conditions are favourable, that is after the rains."

Mr. G. A. Keartland has sent me the following note:—" *Artamus melanops* I never saw south of Oodnadatta, the present terminus of the transcontinental railway in South Australia. On the route of the Horn Scientific Expedition we found them throughout the trip. They were either in pairs or small flocks of five or six, probably parents and young, but never in large flocks like *A. superciliosus*. In Western Australia we met with them at intervals from near Geraldton to West Kimberley, North-western Australia. Their eggs vary considerably; whilst some have a white ground, spotted with lilac, others have a pinky-white ground heavily blotched with red. A clutch of four I took on the Fitzroy River had a dirty white ground heavily marked with umber brown."

The nest is an open cup-shaped structure, composed externally of thin dried plant stalks, and lined inside with fibrous rootlets, and occasionally with horse-hair. An average nest, taken by the late Mr. K. H. Bennett, measures externally four inches in diameter by three inches in

* Suppl. Bds. Aust., fol., pl. 7 (1869).

depth: internal diameter two inches and a quarter, depth one inch and a half, and is generally placed in a low bush. Near Louth, Mr. Edward Lord Ramsay found this species breeding at the latter end of September and October 1889, the nests being placed in Emu-bushes and low Iron-woods from seven to nine feet above the ground, or the tops of hollow Mulga stumps. At Coonamble I found them in November, 1906, in low bushes.

The eggs are four in number for a sitting, oval or swollen oval in form, the shell being close-grained, smooth and more or less lustrous, and vary considerably in the character and colour of their markings. A common type is of a fleshy-white ground colour, uniformly spotted and blotched with dull reddish and umber-brown, with fainter underlying markings of a lighter shade, intermingled with a few nearly obsolete spots of dull bluish-grey. A set of four, taken on the 16th October, 1889, measures:—Length (A) 0·85 × 0·65 inches; (B) 0·86 × 0·67 inches; (C) 0·85 × 0·67 inches; (D) 0·86 × 0·68 inches. Another type frequently found is of a reddish-white ground colour, which is dotted, spotted and heavily blotched, but particularly towards the larger end, with purplish-red, intermingled with fainter underlying markings, and clouded patches of pale purplish-grey. In colour and character of markings the eggs of this type closely resemble the eggs of the Helmeted Friar-bird (*Tropidorhynchus buccroides*), but are, of course, considerably smaller:—Length (A) 0·88 × 0·67 inches; (B) 0·9 × 0·7 inches; (C) 0·89 × 0·68 inches; (D) 0·9 × 0·69 inches.

September and the three following months constitute the usual breeding season of this species in New South Wales.

Artamus albigentris.

WHITE-VENTED WOOD SWALLOW.

Artamus albigentris, (nec *Ocypterus albiventer*, Less., *Traité d'Orn.*, p. 370); Gould, *Proc. Zool. Soc.*, 1847, p. 31; *id.*, *Bds. Aust.*, fol. Vol. II., pl. 30 (1848); *id.*, *Handbk. Bds. Austr.*, Vol. I., p. 149 (1865).

Artamus hypoleucus, Sharpe, *Cat. Bds. Brit. Mus.*, Vol. XIII., p. 17, (1890); *id.*, *Hand-l. Bds. Vol. IV.*, p. 261 (1903).

ADULT MALE—Like the adult male of *ARTAMUS MELANOFS*, but with the under surface paler and the under tail-coverts white. Total length in the flesh 7·2 inches, wing 4·9, tail 2·9, bill 0·75, tarsus 0·8.

ADULT FEMALE—Similar in plumage to the male, but with the vent as well as the under tail-coverts white.

Distribution—Queensland, Northern New South Wales.

THE White-vented Wood Swallow, inhabiting the northern portion of New South Wales and Queensland, I regard only as a northern form of the preceding species, *Artamus melanofs*, between which I can find a complete intergradation. Some specimens obtained in Northern New South Wales have a few of the shorter central under tail-coverts blackish, and which appears to be gradually lost in examples procured in different localities farther north, in Queensland.

Mr. A. F. Smith sends me the following note:—" *Artamus albigentris* is one of the commonest species in the Herbert River District, North-eastern Queensland. It wedges its nest in at the base of a *Pandanus*, and always on the western side of the tree, probably as a shelter from the prevailing wind."

Mr. Thos. P. Austin sends me the following notes from Cobborah Station, Cobborah, New South Wales:—" *Artamus hypoleucus* is by far the most uncommon species of the genus *Artamus* that visits this district, only a few pair of birds appearing in the spring of dry seasons. This. I

presume, is only through severe droughts in other parts. Only upon two occasions have I known them to breed here, and one of these nests was attended by three birds, one male and two females, one of which I saw sitting upon three eggs, which were in a fairly advanced state of incubation. The male was busily engaged feeding both females. For several days I noticed a pair of birds in the tree where the nest was, so thinking they must have a nest I watched them, and for about half an hour the male fed the female; then, to my surprise, a second female appeared and was also fed, when she immediately returned to the nest, which was placed high up in a Red Gum tree, where a branch had broken off."

On the 9th of November, 1896, I found a pair of these birds breeding in company with *Artamus personatus*, in a ring-barked paddock near the Little Mountain, East Narrabri. The nest was built in a piece of curled bark, hanging from the under side of a limb of a dead *Belar*, *Casuarina glauca*, about nine feet from the ground. It was an open shallow structure, formed externally of thin dried plant stalks, and lined inside with fibrous roots. On the same date of the following year I found another nest of this species, about seventy-five miles farther north, and near the Gwydir River. This nest was built in the top of a hollow stump, about three feet from the ground, and consisted only of a scanty lining to the cavity of fibrous roots and black horsehair. Although the nest contained eggs, and I disturbed the female while sitting, these birds were extremely shy, and it was some time before I managed to secure them.

The eggs are four in number for a sitting, and cannot be distinguished from those of *Artamus melanops*. A set of four taken by Mr. H. G. Barnard, at Daringa, Queensland, on the 24th October, 1892, measures:—Length (A) 0.88 × 0.65 inches; (B) 0.85 × 0.66 inches; (C) 0.83 × 0.62 inches; (D) 0.89 × 0.64 inches.

October and the two following months constitute the usual breeding season of the White-vented Wood Swallow.

Artamus minor.

LITTLE WOOD SWALLOW.

Artamus minor, Vieill., Nouv. Dict. d' Hist. Nat., Tom XVII., p. 298 (1817); Gould, Bds. Austr., fol. Vol. II., pl. 28 (1848); *id.*, Handb. Bds. Austr., p. 146 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 21 (1890); *id.*, Hand-l. Bds., Vol. IV., p. 262 (1903).

ADULT MALE—General colour above and below chocolate-brown; upper and under tail-coverts black; wings leaden black, the tail slightly darker, all but the central pair of feathers and the outermost one on either side largely tipped with white, except on the extreme edge of the outer web; lores and a narrow frontal line black; chin blackish; bill (of skin) deep blue, black at the tip; legs and feet black. Total length 5.9 inches, wing 4.2, tail 2.6, bill 0.45, tarsus 0.5.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Central Australia.

THE Little Wood Swallow is widely distributed over the northern portion of the Australian Continent. Gould records specimens from Port Essington, and states that he met with this species in abundance as far south as the Lower Namoi River in New South Wales. Although I have made several visits to this district I never succeeded in meeting with this species in this, or in any other part of the State. Evidently this is another instance like *Poephila cincta* of a species once common during the time of Gould's visit that no longer occurs in New South Wales. Among the specimens enumerated in the "Catalogue of Birds in the British Museum,"* is one collected by Gould in New South Wales, but the precise locality is not recorded.

* Gould, Cat. Brit. Bds. Mus., Vol. XIII., p. 21 (1890).

In Queensland it is apparently common, and there are specimens in the Australian Museum Collection from Cairns, procured by Mr. R. Beveridge; from Cardwell, by Mr. K. Broadbent, and from Port Denison by Mr. George Masters. Dr. W. Macgillivray informs me that he met with it near Cloncurry in the Burke District; Mr. A. F. Smith, sent me a note of its appearance during a period of drought at Ingham, on the Herbert River: for many years past Mr. H. G. Barnard has taken its nests and eggs in the Dawson River District, and Mr. S. Robinson informs me that he found this species breeding at Burrenilla, near Cunnamulla. In 1886 Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower obtained a number of specimens in the vicinity of Derby, North-western Australia, Mr. G. A. Kearnland, while a member of the Horn Scientific Expedition in 1894, observed a number of these little birds soaring over the Levi Range in Central Australia, and Dr. E. Hartert has recorded² two specimens from Eureka and Nellie Creek in the Northern Territory of South Australia.

Artamus minor mostly resembles a miniature *A. tenebrosus*, from which in other respects it may be chiefly distinguished by the absence of the white margin to the outer webs of the second, third and fourth primaries, and by its under wing-coverts being pale brown instead of pure white, characters which show to advantage when *A. tenebrosus* is on the wing.

Mr. G. A. Kearnland writes me as follows:—"I only met with *Artamus minor* on one occasion in June 1894, in the western extremity of the West Macdonnell Range, Central Australia. They were flying backwards and forwards in a deep ravine, or perched on trees and shrubs projecting out of the rocky wall. Although there appeared to be over one hundred of these little Wood Swallows scattered around within two hundred yards of where I stood, each bird seemed to lead an independent life. The only simultaneous action was for all the perched birds to fly when I fired a shot. They sought their food on the ground or darted from their perches to capture a passing insect. I have heard from Mr. Jas. F. Field, that they afterwards visited Alice Springs, where they bred and enabled him to forward me two sets of their eggs."

Mr. A. F. Smith writes me:—"While in the Herbert River District, North-eastern Queensland, I only once met with *Artamus minor*. It was during a period of drought in May, 1902, when I saw a small flock of six birds perched on the telegraph wire."

While resident at Point Cloates, North-western Australia, Mr. Tom Carter wrote me:—" *Artamus minor* is fairly common about the cliffs and gullies of the ranges where they breed, but I have not seen them away from there."

Mr. S. Robinson sends me the following note from Cunnamulla, Queensland:—" *Artamus minor* is not very plentiful here, and until 1905 I had never taken their nest, as I could not find them. Now I know where to look, they make their nest in the end of a small hollow spout, Mulga preferred, a very poor structure, a few bits of dried grass and small leaves. I took one set with two eggs, one richly marked, the other white, with dark brown blotches at smaller end."

Mr. H. L. White of Belltrees, Scone, New South Wales, has kindly forwarded me notes, made on his behalf by Mr. F. Lawson Whitlock, while collecting for him on the De Grey and Coongan Rivers, North-western Australia, inland from Port Headland, and about midway between Point Cloates and Derby, from which I have extracted the following information:—"I first met with *Artamus minor*, at Gorge Creek where it haunted the rocky hill sides, and afterwards secured three specimens on the Upper Coongan, a still more rocky locality. This Wood Swallow never seems to be away from rocks. It is by no means timid and will fly right up to and perch within a few feet of an intruder examining its nest. It has a very pleasing song, resembling that of *Hirundo neoxena*, and while on the wing its small size and the two central and outer tail feathers being uniform in colour in contrast with the white tips of the remainder renders identification easy. It was not until September 1908, that I found its nest. I had followed a pair of Thrushes

² Nov. Zool., Vol. XII., p. 240 (1905).

up a very rocky side creek of the main river, when I observed a Little Wood Swallow skim right up the precipitous face of a cliff and then back again, and thought that I could distinguish something like a nest in a very small cleft. I climbed up to the spot, and there in a cavity hardly large enough to admit my hand, was a loosely constructed nest, formed of bits of spinifex pressed into the cleft by the weight of the bird into a shallow cup-shaped depression. It contained one egg, which I left, and returning in a week's time secured a pair. Lower down the creek I observed a second pair of birds and located their nest in a hollow spout of a small gum tree, from which I eventually took three eggs. Still lower down the rocky sides of this creek where it had developed into a massive precipice, I found another nest in a perpendicular joint of the rock, in a small cavernous hollow and about two feet from the floor, and a few days later took three eggs from it. A fourth nest I found was by the main Coongan River, and was built in an old mud nest of the Fairy Martin (*Petrochelidon ariel*), from which the spout had been broken away, and I also took three fresh eggs from this nest. A colony of Fairy Martins were also breeding a few feet away."

The nest, an open cup-shaped structure of twigs and plant stems lined with rootlets, is placed in the end of a hollow branch or in a cavity in the trunk of a tree; in some instances the nest consists only of a scanty lining of fibrous rootlets to the hole.

The eggs are three in number for a setting, oval in form, the shell being close-grained, smooth and lustrous. They are of a dull white ground colour which is spotted and blotched with yellowish and light umber brown intermingled with underlying spots and blotches of faint slaty-grey, the markings being confined principally to the thicker end where they form in some places coalesced patches, or more or less irregular zones. A set of three, taken by Mr. H. G. Barnard, at Duarina, Queensland, measures:—Length (A) 0·7 × 0·55 inches; (B) 0·71 × 0·56 inches; (C) 0·69 × 0·55 inches. Another set of three taken by him at Bimbi, Duarina, on the 16th October, 1908, measures:—Length (A) 0·73 × 0·57 inches; (B) 0·77 × 0·58 inches; (C) 0·75 × 0·6 inches.

Family STURNIDÆ. Genus CALORNIS, Gray.

Calornis metallica.

SHINING CALORNIS.

Lamprotorornis metallica, Temm., Pl. Col., Tom II., pl. 266 (1824).

Aplonis metallica, Gould, Bds. Austr., fol. Vol. Suppl., pl. 33 (1869).

Calornis metallica, Gould, Handbk. Bds. Austr., Vol. I., p. 477 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 138 (1890).

ADULT MALE—*General colour above glossy oil-green with purplish reflections; hindneck glossy-green; crown of the head, nape, and centre of back purplish-violet; quills and tail feathers black, glossed with dull steel blue; cheeks and throat steel-green with a purplish shade, except on the lengthened lanceolate feathers on the lower throat; foreneck purplish-violet; remainder of the under surface dull oil-green glossed with purple on the sides of the breast; under tail-coverts steel-green; bill black; legs and feet black; iris red. Total length 9 inches, wing 4·3, tail 4·1, bill 0·7, tarsus 0·85.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-eastern Queensland, Islands of Torres Strait, New Guinea.

THE range of the Shining Calornis, or more commonly known "Starling" or "Weaver Bird," in Australia, extends from Cape York to the neighbourhood of the Herbert River District, in North-eastern Queensland. It is a strictly migratory species, commencing to build shortly after its arrival and departing again after the breeding season is over. These birds

nest in communities, their nests sometimes being placed close together, at other times apart, the same tree being resorted to as a nesting-site year after year. Mr. George Masters informs me that while a member of the "Chevert Expedition," fitted out by the late Sir William Macleay, in 1875, it was estimated that a single tree, cut down on Yule Island, contained upwards of eleven tons of nests. An examination of a number of the nests proved by no means an easy task, for the branches of the tree were found to be infested by a small species of green ant, which inflicted a severe and extremely painful bite.

Mr. Frank Hislop sends me the following notes:—"The Shining *Calornis* is a migratory species, arriving in the valley of the Bloomfield River at the latter end of August. These birds are very common, and breed usually either in "White Pine" or "Milk Wood" trees, both of which have very smooth bark. Generally they build about the foothills, owing, I think, to the timber being taller than higher up on the hill sides; there are exceptions, however, for I have seen trees in which they have built their nests growing at an altitude of over one thousand feet. The eggs are usually two or three in number for a sitting. After these birds have done breeding in March they leave the district, and are not seen again until the following season. The aboriginal name for this species is 'Boodgier-boodgier.'"

Messrs. E. J. Cairn and Robert Grant obtained a large number of these birds while collecting near Cairns on behalf of the Trustees of the Australian Museum, and the latter has supplied me with the following notes:—" *Calornis metallica* used to nest in a large tree right in the centre of the track leading to the Pyramid Sugar Plantation, every branch, from the lowest to the highest, containing clusters of nests. I have seen branches of this tree lying on the ground eight inches or more in thickness, broken off, I presume, by the weight of nests built on them, as the break was fresh and free from flaws. I am certain that some of these broken branches contained over a hundred weight of nests. The chattering of the birds was deafening, and throughout the day, from sunrise to sunset, flocks could be seen coming from or going to the tree. On one occasion I fired a shot into one of these flocks, when just returning to the tree, and picked up fifteen dead birds. I only knew of another nesting tree in the district, and that was about five miles from the one referred to above. This was not nearly so large, and did not contain more than half the number of nests, but under both trees there were always a lot of broken egg-shells and dead young ones lying beneath them. We did not meet with this species on the Bellenden Ker Range."

Mr. J. A. Boyd, while resident at Ripple Creek Plantation, Herbert River, North-eastern Queensland, sent at various times the following information relative to this species:—

1888—31st August: Noted the arrival of *Calornis metallica* to-day.

1891—11th September: *Calornis metallica* arrived yesterday.

1892—10th November: Plenty of the Weaver Birds breeding.

1893—9th September: Noted first *Calornis metallica*. Began building on the 17th instant.

1894—28th February: *Calornis metallica* still here.

1895—15th March: *Calornis metallica* still here. Rollers gone.

This bird is not a resident, arriving in September to breed and leaving about March. Although in olden times they used to patronise the fig-trees they have quite deserted them now and almost invariably breed in the "White-wood," one of our largest scrub trees, having a barrel running up for over one hundred feet without a limb. Unless they use the same nest for the second brood, they only lay once, certainly a few this year began to start a colony in September, but as soon as the rain came they desisted, and this is the only case I have known. On the 16th November, 1895, I got an aboriginal to climb a tall "White-wood" and lower down with a rope two branches covered with nests of *Calornis metallica*; to my intense disgust there was not an egg, though they have been building for months. The blacks assert that they raise three broods in

the same nest every year. I picked up a nest blown down by a high wind, it is very loosely built of fibre, principally from bark of trees, but a good proportion consisted of the dead twisted tendrils of a vine. *Calornis metallica* is a great fruit robber, but takes nothing that it cannot swallow whole, hence Mulberry-trees suffer most from its depredations. In 1897 these birds were first observed on the 3rd September, and in the following year they arrived precisely on the same date, and went at once to the stableman's house to find the Pencil Cedar tree they had bred in the previous year; this had been felled, but after a long and noisy debate they decided to nest in a tree close by."

The late Mr. W. S. Day, writing on the 7th September, 1891, from Kuranda, near Cairns, remarks:—"The Starlings are now breeding in a 'White-wood' tree near here; some are

making new nests, others are busy repairing old ones. The nests are all built on the lower branches of the tree, and are about one hundred to one hundred and fifty feet from the ground. They always select this kind of tree, and one with parasites or creepers growing on it."



NEST OF SHINING CALORNIS.

Mr. A. F. Smith presented to the Trustees of the Australian Museum six nests procured by him on Hambledon Plantation, near Cairns. They vary from almost globular to oval in form, the entrance in some being spout or tunnel-like, and running near the whole length of the nest, ingress and egress being obtained towards the middle or the bottom of the structure, and the entrance itself more or less concealed. Outwardly they are somewhat roughly constructed of long curly tendrils of a climbing plant, intermingled with palm-fibre and skeletons of leaves, the inside of the nest at the bottom being lined with dried strips of palm leaves. An average nest measures externally ten inches in length by eight inches in breadth, and across the entrance two

inches. They were suspended at the top to the leafy ends of the lower branches of a high tree.

The eggs, two or three in number for a sitting, vary from rounded to elongate oval in form, the shell being close-grained, smooth and more or less lustrous. They are of a delicate green or greenish-white ground colour, which is dotted, freckled, spotted or blotched with different shades of purplish-red and underlying markings of purplish-grey; some specimens have a few large blotches or spots on the larger end only; others have the markings uniformly distributed over the surface of the shell, or have only scattered and almost invisible dots, and some are almost devoid of markings. Occasionally some of the markings are rust-red or reddish-brown, and in one specimen now before me a single large blotch is of an ochreous hue. A set of two taken near Ingham, at the mouth of the Herbert River, measures:—Length (A) 1×0.87 inches; (B) 1.05×0.88 inches. A set of three taken at Cape York measures:—Length (A) 1.2×0.18 inches; (B) 1.8×0.82 inches; (C) 1.17×0.78 inches.

Young birds resemble the adults on the upper parts, but are much duller in colour, the wings dull black without any oil-green gloss, except on the inner secondaries and inner wing-coverts; all the under surface white streaked with black, except on the centre of the abdomen. Wing 4 inches. A further progress towards maturity is exhibited by some feathers on the under parts being glossy-green instead of black.

September and the three following months constitute the usual breeding season in North-eastern Queensland.

Family PLOCEIDÆ.

Sub-family VIDUINÆ.

Genus STAGANOPLEURA, Reichenbach.

Staganopleura guttata.

SPOTTED-SIDED FINCH.

Loxia guttata, Shaw, Mus. Lever., p. 47, fig. 2 of Plate (1792).

Amadina lathamii, Gould, Bds. Austr., fol. Vol. III., pl. 86 (1848).

Staganopleura guttata, Gould, Handbk. Bds. Austr., Vol. I., p. 417 (1865).

Staganopleura guttata, Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 292 (1890).

ADULT MALE—*General colour above including the wings brown; rump and upper tail-coverts bright crimson; tail black; forehead, crown of the head and hindneck ashy-grey; lores black; throat white; a broad band on the foreneck black; sides of foreneck and flanks black, each feather having a subterminal white spot; breast, abdomen and under tail-coverts pure white; bill vinous-red shaded with lilac at the base; legs and feet dark grey; iris red. Total length in the flesh 4.6 inches, wing 2.7, tail 1.7, bill 0.45, tarsus 0.7.*

ADULT FEMALE—*Similar in plumage to the male, but the black band on the foreneck is narrower.*

Distribution—Southern Queensland, New South Wales, Victoria, South Australia.

THE Australian members of the Family Ploceidæ are of more than ordinary interest, for in addition to their usual attractive plumage, as a rule they live well and breed freely in confinement. *Taniopygia castanotis*, *Munia pectoralis*, *Paphila cincta*, and *P. acuticauda*, were all breeding contentedly together at the same time in an aviary Dr. E. P. Ramsay formerly had at the Australian Museum. A large export trade in Finches is done every year with the Continent and England; in one shipment I saw, in April 1902, over five thousand Finches that left Sydney for Antwerp. Much has been done to popularise the study of the habits of Finches in confinement, by the labours of Dr. Arthur G. Butler, in his excellent work on "Foreign Finches in Captivity." Special attention too, is being paid to the subject by the members of the "Avicultural Society," and more particularly to the breeding habits, not only of Finches, but of all species of birds living in confinement, the observations of many of its members being duly recorded in the "Avicultural Magazine," London, the Journal of the Society.

In a wild state an interest also attaches to many species of Finches for their sociable habits, breeding freely about houses and gardens, and often selecting most unusual sites as nesting places. It must not be forgotten that to a large extent, particularly during the late autumn and winter months their food, consists of insects, although in confinement the greater number of Australian species thrive well wholly on a granivorous diet.

The Spotted-sided Finch or "Diamond Sparrow" as it is more frequently called, is distributed throughout the southern portions of Queensland, New South Wales, Victoria, and the eastern parts of South Australia. In the neighbourhood of Sydney it is more plentiful in the western

suburbs than close to the coast, and is still common in the open forest lands between Parramatta and Penrith. It occurs throughout the Blue Mountains, and I have observed it but in diminished numbers as far west as Coonamble. Around Sydney it is sometimes caught by youthful bird-trappers, but far less frequently than the "Red-head," (*Egitha temporalis*), or the acclimatised Goldfinch (*Carduelis elegans*). During the autumn it congregates in small flocks from ten to twenty or more individuals, passing much of its time on the ground and feeding on various grass-seeds which constitute its usual food. When disturbed the rich crimson rump and upper tail-coverts are conspicuously displayed as the flock seeks refuge in flight.

A single low but remarkably clear mournful whistle, is the principal call note of this species, and which is repeated at intervals.

The wing-measurement of adult males varies from 2.55 to 2.75 inches. Individual variation is not uncommon in this species. Most frequently it consists in scattered dull crimson feathers on the underparts. There is a specimen in the South Australian Museum with a few dull crimson feathers intermingled with the white feathers on the breast; a similar one in the Australian Museum collection also has the feathers on the lower throat indistinctly margined with dull crimson, and another one with a bright crimson feather among the white under tail-coverts. The most remarkable specimen in the collection is a fine old adult female, which has the rump and upper tail-coverts bright chrome-yellow, instead of rich crimson. This bird was shot out of a flock of about twenty of normal plumaged individuals, by the late Mr. J. A. Thorpe, at George's River, in May 1888.

From Copmanhurst Mr. G. Savidge writes me under date 14th May, 1907:—" *Staganopleura guttata* is sparingly dispersed over this district. I have not seen it in large numbers anywhere, it seems to build nearly all the year round, a pair have just got young in a pine tree near my garden. It resorts to the same tree to build in time after time, and I have frequently seen it pinching off the strong straight stems of summer grass to build with, and carrying feathers from the poultry yard; it usually lays five or six eggs, and often breeds in small colonies, five or six nests being sometimes found in gum saplings close together.

From Cobborah Station, Cobbara, New South Wales, Mr. Thos. P. Austin has sent me the following notes:—" *Staganopleura guttata* remains with us at all times of the year, but never in very great numbers. Their large bottle-shaped grass nests are to be found placed in a great variety of places such as in small thick bushes to the top-most branches of lofty red-gums; in deserted *Pomatostomus temporalis* nests, but in this district their favourite nesting site is the underneath part of the nests of *Haliastur sphenurus*: this is probably with the idea of protection from their enemies. Last year I counted twenty-two of their nests in a single Apple tree (*Angophora lanceolata*). From the amount of dirt found in old nests, it would appear that they use it for roosting in long after breeding is finished. Their call note is a long drawn out low whistle, which is very difficult to distinguish from one note of the female *Petroica bicolor*."

Mr. E. H. Lane sends me the following note:—" On Wambangalang Station, near Dubbo, New South Wales, I have seen as many as five nests of the Spotted-sided Finch in a Box-tree, in which was also built a nest of the Brown Hawk. On one occasion I saw a nest of the Spotted-sided Finch attached to the sticks underneath a nest of the Square-tailed Kite."

Mr. G. A. Keartland sends me the following note:—" The nests of *Staganopleura guttata* are often placed some distance from the ground. Of three nests I saw at Melton, Victoria, on the 9th November, 1898, all were over forty feet from the ground. On a previous visit to the same locality I saw a pair of these birds building their nest beneath and among the sticks of a Brown

Hawk's nest. On revisiting the spot a week later, I disturbed both Hawk and Finch from their respective nests."

From South Australia Dr. A. M. Morgan writes me as follows:—" *Staganopleura guttata* is still common about Adelaide, and fairly numerous as far north as Port Augusta. A favorite nesting place is the butt of a mistletoe, but any thick bushy branch is made use of. I have found several nests decorated on the outside with small yellow everlasting flowers, giving them a very pretty appearance. The eggs are three or four in number, usually the latter. They use their old nests for shelters all through the winter, and I believe until the next nest is built. I saw a nest at Port Augusta in July, and found one on the 2nd December, 1905, at Blackwood, near Adelaide, with three young birds."

The nest is spherical or retort-shaped in form, with a bottle-neck-like entrance, and varying somewhat in size, according to the position in which it is built. A nest in the Australian Museum group collection I found at Cook's River, near Croydon Park, on the 30th December, 1893, is nearly spherical in form, with a short spout-like entrance. It is formed of dried grasses firmly bound round with the wiry stems of a *Drosera*, which stand out at all angles on the exterior; inside it is very sparingly lined at the bottom of the structure with fowls' feathers. Externally it measures from the narrow entrance to the back of the nest nine inches in length, and in breadth seven inches. It was built in a Needle-bush (*Hakea acicularis*), five feet from the ground, and contained three fresh eggs. The nests are generally placed low down in thick bushes, or in Turpentine or gum saplings; also in vines growing around verandahs. I have often seen them built in a *Loranthus* growing on a *Eucalyptus* fully fifty feet from the ground.

In New South Wales five is usually the number of eggs laid for a sitting, sometimes six; they are pure white, and vary from a lengthened ellipse to elongate oval in form, the shell being close-grained, smooth and lustreless. A set of five taken at Croydon Park on the 15th October, 1892, measures:—Length (A) 0·8 × 0·5 inches; (B) 0·76 × 0·47 inches; (C) 0·77 × 0·47 inches; (D) 0·8 × 0·78 inches; (E) 0·78 × 0·48 inches. A set of five taken at Belmore on the 26th March, 1893, measures:—Length (A) 0·74 × 0·5 inches; (B) 0·74 × 0·52 inches; (C) 0·73 × 0·51 inches; (D) 0·7 × 0·5 inches; (E) 0·73 × 0·51 inches. A set of four, taken by Mr. H. G. Barnard at Bimbi, Daringa, Queensland, on the 10th June, 1908, measures:—Length (A) 0·73 × 0·48 inches; (B) 0·73 × 0·51 inches; (C) 0·74 × 0·5 inches; (D) 0·72 × 0·5 inches.

Young birds resemble the adults but have the bill black and are duller in colour, lores like the ear-coverts ashy-brown, band on the foreneck and flanks greyish-brown, the former indistinctly mottled with dull white, and the latter alternately barred with dull white and dark brown. Wing 2·5 inches. In their progress towards maturity the lores are black, and black feathers appear in the band on the foreneck, and black feathers with a white spot at the tip among the barred flank feathers. Wing 2·6 inches. In this immature stage it will be seen that the wing-measurement equals that of the adult.

September and the four following months constitute the usual breeding season in New South Wales. Nests may be found with eggs about the middle of September, but more often in October. I have taken fresh eggs for a second brood as late as the end of December, and again in the autumn months, when odd pairs occasionally breed in favourable seasons, towards the end of March. At Roseville I saw a Spotted-sided Finch carrying grass to a half finished nest in a gum sapling on the 23rd May, 1908.

Genus ZONÆGINTHUS, *Cabanis*.

Zonæginthus bellus.

FIRE-TAILED FINCH.

Loric bella, Lath., Ind. Orn., Suppl., p. xlvi. (1801).

Estrela bella, Gould, Bds. Austr., fol. Vol. III., pl. 78 (1848).

Zonæginthus bellus, Gould, Handbk. Bds. Austr., Vol. I., p. 406 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 293 (1890).

ADULT MALE—*General colour above brown slightly tinged with olive, and having numerous blackish cross-lines, finer and less distinct on the head, broader and more conspicuous on the lower back; wings like the back, inner webs of quills blackish, the transverse barrings almost obsolete on the outer webs of the primaries; rump and upper tail-coverts crimson; lateral tail-feathers brown with blackish cross-bars, the central ones blackish and margined on their basal portion with dull crimson; lores, a narrow frontal line and feathers around the eye black; all the under surface greyish-white crossed with narrow black lines, which are broader and the interspaces of a clearer white on the lower sides of the breast and the abdomen; centre of the abdomen and under tail-coverts dull black. Total length in the flesh 4.6 inches; wing 2.25, tail 1.8, bill 0.45, tarsus 0.65.*

ADULT FEMALE—*Resembles the adult male but the centre of the abdomen is barred like the remainder of the under surface, not black.*

Distribution—New South Wales, Victoria, South Australia, Tasmania, and some of the larger islands of Bass Strait.

THE type of the present species was described by Latham, in his "Index Ornithologicus," from a single specimen obtained in New South Wales, and is founded on the "Black-lined Grosbeak" of his "General Synopsis of Birds."^{*} Referring to the present species in the "Transactions of the Linnean Society," † Messrs. Vigors and Horsfield remark:—"Some specimens in the collection were brought by Mr. Brown from Port Jackson, where he obtained them in September, 1803." Although still found here it is by far the rarest species of Finch frequenting the neighbourhood of Sydney. It generally inhabits scrub-lined creeks and swampy localities, and is occasionally met with about the upper parts of Middle Harbour and Hornsby; in the latter locality Mr. J. A. Thorpe and myself both procured specimens, and the former also obtained its nest and eggs. Farther afield Mr. R. Grant found it breeding at Helensburgh; also inland at Lithgow, on the Blue Mountains, 3009 feet above sea level. It is also sparingly distributed throughout the coastal districts of Victoria and the south-eastern portion of South Australia, two specimens from Mt. Compass being received for examination from the Trustees of the South Australian Museum, Adelaide. It is common on some of the larger islands of Bass Strait, and Tasmania is its stronghold. While the Family *Ploceidæ* is well represented on the Australian Continent, it is remarkable that the Fire-tailed Finch is its only representative in Tasmania. I met with it in the scrub at The Springs on Mount Wellington, near Hobart, and at New Norfolk, on the banks of the Derwent River. Mr. Malcolm Harrison and Mr. E. D. Atkinson inform me that it is very common, and breeds freely, at Table Cape in the north-western portion of the island.

^{*} Gen. Syn. Bds., Suppl. II., p. 198. † Trans. Linn. Soc., Vol. XV., p. 257 (1827)

From Bellerive, Tasmania, Dr. L. Holden writes me:—" *Zonaginthus bellus* is fairly common, but perhaps is being ousted by the introduced House Sparrow and the Goldfinch. It is more numerous in the wet north-west of the island than in the dry south-east. I have found it breeding in September and October, laying long narrow white eggs, pink before they are emptied. The nest is in shrubs, an untidy lump of dry grass, globular, with an entrance like a tunnel, and lined inside with feathers. The eggs are four or five in number. The Fire-tailed Finch is sometimes trapped by means of a call-bird decoy."

Mr. E. D. Atkinson, of Waratah, sends me the following note:—" A nest of *Zonaginthus bellus*, found by me on the old Strahan-Queenstown road, west coast of Tasmania, was composed of coarse grasses lined with wool, and contained four hard set eggs. The tunnel-like entrance to the nest measured quite ten inches long by about two inches across, and was curved in shape something like a sickle. But for the fluttering of the bird's wings as she escaped from this queer nest, I would probably have passed it by, for though they are generally large for the size of the bird, and conspicuously placed, this one was well concealed in a thick bush, about six feet from the ground. Another I found near Waratah, on 17th January, 1905, contained three eggs slightly incubated, which shows that three made the full complement. I found another nest near Waratah, in a "cutting rush," only about three feet up, and in this instance the number of eggs was only two, but, as they were perfectly fresh, more would probably have been laid. This species is not so often met with here as on the coast (Waratah being 2000 feet above sea level), where it is fairly common. I remember on one occasion seeing a Fire-tailed Finch fly up on to a telegraph wire with a long straw, evidently *en route* to its nest, but as soon as I was observed beneath the straw was dropped and the bird flew quietly away."

A nest in the Australian Museum collection, taken by Mr. J. A. Thorpe at Hornsby on the 9th November, 1886, is globular in form with a long narrow neck-like entrance, and is formed externally of long pieces of coarse dried grasses, and is lined inside with finer grasses. The nest proper measures externally seven inches in diameter, and the neck-like entrance ten inches in length by one inch and a half across the entrance. It was built in a bushy tree ten feet from the ground, and contained five fresh eggs, the birds being secured at the same time. Tea-trees and low thick bushes are also resorted to as nesting sites by this species. Two nests found by Mr. E. D. Atkinson at Table Cape, North-west Coast of Tasmania, on the 15th November, 1891, were built of coarse grasses and lined at the bottom of the domed portion with small black feathers. One was built in a prickly Acacia bush, and contained five slightly incubated eggs; the other was built in a tea-tree, and had the usual complement, five fresh eggs.

The eggs are usually five in number for a sitting, of a lengthened ellipse or elongate oval in form, pure white, the shell being close-grained, smooth and lustreless. A set of five measures:—Length (A) 0.73 × 0.48 inches; (B) 0.72 × 0.47 inches; (C) 0.71 × 0.48 inches; (D) 0.7 × 0.49 inches; (E) 0.71 × 0.49 inches. A set of five taken by Mr. E. D. Atkinson at Table Cape, on the north-west coast of Tasmania, on the 15th November, 1891, measures:—Length (A) 0.75 × 0.5 inches; (B) 0.72 × 0.5 inches; (C) 0.7 × 0.5 inches; (D) 0.7 × 0.5 inches; (E) 0.71 × 0.52 inches.

Young birds have the bill black, and are browner above and below than the adults, the blackish cross lines narrower and more indistinct. forehead and crown of the head brown, and the blackish lores feathers around the eye and narrow frontal band, far less pronounced. Wing measurement the same as that of the adult, 2.25 inches.

September and the three following months constitutes the normal breeding season of this species.

Genus **EMBLEMA**, *Gould*.**Emblema picta.**

PAINTED FINCH.

Emblema picta, Gould, Proc. Zool. Soc., 1842, p. 17; *id.*, Bds. Austr., fol. Vol. III., pl. 97 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 429 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 295 (1890); North, Rep. Horn Sci. Exped., Part II., *Zool.*, p. 88 (1896); *id.*, Rec. Austr. Mus., Vol. III., p. 11 (1897); *id.*, Vic. Nat., Vol. XVII., p. 187 (1901).

ADULT MALE—*General colour above pale brown, of a slightly richer shade on the back; upper wing-coverts pale brown, the quills darker and narrowly edged externally with pale brown; tail feathers dusky-brown; rump and upper tail-coverts scarlet; lores, forehead, fore part of cheeks, chin, and upper throat scarlet; foreneck, breast and abdomen black spotted with white at the sides, the foreneck and breast with an irregular streak of scarlet feathers down the centre; under tail-coverts black. Total length 4.2 inches, wing 2.3, tail 1.5, bill 0.5, tarsus 0.6.*

ADULT FEMALE—*Differs from the adult male in having only the lores, the feathers above the eye and at the base of the lower mandible scarlet; the under parts are of a duller black and more largely spotted with white; chin black; throat and foreneck black spotted with white, and on the centre of the breast only a few scarlet feathers.*

Distribution—Western Australia, North-western Australia, Northern Territory of South Australia, Central Australia, Northern Queensland, New South Wales,

GOULD described the type of this species in 1842 from a single specimen obtained by the late Mr. Bynoe on the north-western coast of Australia. According to Dr. A. G. Butler,† Herr Wiener records purchasing a pair of living Painted Finches in Europe in 1869, and another pair at Liverpool in 1873. In November 1886, Dr. E. P. Ramsay exhibited a number of skins of this species at a meeting of the Linnean Society of New South Wales, collected by Mr. E. J. Cairn about one hundred miles inland from Derby. In 1890 Dr. R. B. Sharpe records † five specimens collected by Mr. F. Gibson in the interior of Northern Australia, and an adult female from Champion Bay, Western Australia. The members of the Horn Scientific Expedition in 1894 obtained specimens at McMinn's Range, Bago's Spring, and Mereenie Bluff in Central Australia. Later on in 1896 while Mr. G. A. Keartland was a member of the Calvert Exploring Expedition in 1896-7, he again met with this species and procured four adult males and one female at Johanna Springs in North-western Australia. On the 23rd of September, 1896, Mr. A. M. N. Rose presented three adult male specimens in the flesh to the Trustees of the Australian Museum. These birds were procured the previous day by his nephew, Mr. Arthur Payten, at Campbelltown, thirty-four miles south-west of Sydney. They were shot from a flock of five while searching for grass seeds on a hill devoid of any cover, and during a period of excessive drought inland. Roughly estimated the nearest recorded locality in which these birds had been previously obtained was in Central Australia, thirteen hundred miles west of Campbelltown. In 1901 Dr. W. Macgillivray forwarded me, among others, a skin of this species for examination. It was obtained by his brother the late Mr. A. S. Macgillivray, at Leilavale Station, on the Fullarton River, near Cloncurry, in the Burke District of Northern Queensland.‡

An adult male in the Australian Museum collection has a few scattered scarlet feathers on the lower throat and forming with those on the centre of the foreneck and breast an irregular scarlet line down the centre of the under surface. As I have pointed out elsewhere,§ two specimens marked females by Mr. G. A. Keartland are indistinguishable in plumage from adult males, but the sexes of the specimens obtained by Mr. E. J. Cairn vary as described above.

* Foreign Finches, p. 153, (1894-6).

† Cat. Bds. Brit. Mus., Vol. XIII.

‡ North, Vict. Nat., Vol. XVII., p. 187 (1901).

§ Rep. Horn Sci. Exped. Centr. Austr., *Zool.*, p. 88 (1896).

When resident at Point Cloates, North-western Australia, Mr. Tom Carter sent me the following note:—"I saw several Painted Finches (*Emblema picta*). The crop of one I shot was full of grass seeds, with two bits of blades of green grass."

Mr. G. A. Keartland sends me the following notes:—"I found the Painted Finch (*Emblema picta*) at many of the waterholes on Missionary Plain, Central Australia, and have since received skins from Alice Springs, but in North-western Australia they were only seen at Johanna Springs, Derby, and off the coast near Broome, where they settled on the rigging of the steamer "Australind." Nests of this species found in the gorges of McMinn's Range and Stokes' Pass, were placed in low bushes, built of dried grass, dome shaped and lined with feathers. The eggs are white with a tendency to a bluish tinge like those of *T. castanotis*. They are the most timid of all the Finches and difficult of approach. I think it is utterly impossible to say what the sex of a bird of this species is without dissection. At least that is my experience after skinning and opening over thirty birds, the colour varying with age."

On the 10th May, 1900, Mr. C. Ernest Cowle, of Illamurta, Central Australia, wrote Mr. Keartland as follows:—" *Emblema picta* has been busy building a nest in the tomato plants in the garden during the past few days. Although an egg was laid late yesterday, there was a second one by sunrise this morning. The birds are still carrying material to the nest, which is dome-shaped with a small entrance in the side. It is chiefly formed of dried melon vines and lined with a little grass and wool beaten down." Writing again on the 5th June, Mr. Cowle remarks:—" *Emblema picta* is still sitting all right in the garden. I think there are four young ones, but they look just a pink mass as yet. I used to examine the nest just before dusk and at sunrise so as to disturb the birds as little as possible. After the first egg was laid, each morning there was one more than the previous night, until four eggs were laid, the period of incubation took exactly fourteen days. When the young were hatched the male apparently sat more than the female. The weather was very cold and the birds occupied the nest at night during the building. The nest is about two feet from the ground. I have frequently found them before in low bushes and in Porcupine Grass." On the 31st July, Mr. Cowle writes:—"The cat secured the young of *Emblema picta* when a few days old and spoilt my chance of getting them when nicely fledged."

The following information has been extracted from notes made by Mr. F. Lawson Whitlock, while collecting on behalf of Mr. H. L. White of Belltrees, Scone, New South Wales, in the neighbourhood of the Coongan and De Grey Rivers, in North-western Australia:—"I first met with *Emblema picta* at the crossing of Gorge Creek, where a few haunted the rocky hills adjacent to the creek. Like other Finches, this species must have water and comes down the rocks with great regularity to drink. It appears to be gregarious at all times, even in the breeding season, I met with flocks of a dozen or more. Possibly these may have been non-breeding males, for this sex is more in evidence than the female in this species. When crouching amongst the spinifex the Painted Finch is very difficult to see, the brown colour of the upper parts harmonising so well with the ferruginous soil. I found one nest on the 12th May, 1908, and a day or two later another pair collecting building material. The nest is a rather bulky and loosely made dome-shaped structure, formed of dead pieces of spinifex with a lining of brown vegetable down, and often with a further bed of white vegetable down. The nest is invariably built in a tuft of "buck" spinifex and usually near the top of the tuft. They may be found near the river, amongst the ranges, or again on the big flats, provided water is near at hand. The eggs are commonly three in number, but no doubt sometimes four are laid. They are pure white, small and fragile. The female is a close sitter, and the plumage on the breast is usually dull black with a few dirty grey margins to the feathers, but very old females have a streak of the fiery-red down the centre of the breast. The adult males vary much in intensity of colour, very old birds being the most brilliantly coloured."

A set of four eggs, taken by Mr. C. E. Cowle on the 6th January, 1895, at Illamurta, Central Australia, are pure white, oval in form, slightly pointed at the smaller end, and measures as follows:—Length (A) 0·66 × 0·45 inches; (B) 0·66 × 0·42 inches; (C) 0·6 × 0·45 inches; (D) 0·63 × 0·42 inches; (E) 0·59 × 0·43 inches.

Immature males have only the lores, feathers around the eye and base of bill scarlet, throat black. Immature females have only the lores dull scarlet, and two or three dull scarlet-tipped feathers on the centre of the breast.

In Central Australia Mr. Cowle informs me that he has found nests of this species with eggs from January until June, but the time of breeding is greatly influenced by the rainy season, which usually occurs early in the year.

Genus TÆNIOPYGIA, *Reichenbach.*

Tæniopygia castanotis.

CHESTNUT-EARED FINCH.

Amadina castanotis, Gould, Proc. Zool. Soc., 1835, p. 105; *id.*, Bds. Aust., fol. Vol. III., pl. 87 (1848).

Tæniopygia castanotis, Gould, Handbk. Bds Austr., Vol. I., p. 419 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 311 (1890).

ADULT MALE—*General colour above, including the wings, ashy-brown, slightly greyer on the head and hind neck; centre of the rump white, the sides black; under tail-coverts black, broadly barred and tipped with white; tail dark brown; a narrow line at base of bill black, except on the lower portion of the under mandible; lores and fore parts of cheeks white; white, separated from a conspicuous orange-rufous patch on the remainder of the cheeks and on the ear-coverts by a narrow black line, extending below the eye; throat and foreneck grey crossed with narrow black lines; on the centre of foreneck a black cross-bar, remainder of the under surface and under tail-coverts white; the sides of the body chestnut spotted with white; bill orange-red; legs and feet fleshy orange-red; iris black. Total length in the flesh 4·2 inches, wing 2·15, tail 1·4, bill 0·38, tarsus 0·55.*

ADULT FEMALE—*Differs from the male in being destitute of the conspicuous orange-rufous patch on the sides of the face and ear-coverts, these parts being ashy-grey, as are the throat and fore neck; breast, abdomen and under tail-coverts pale creamy-buff; sides of body ashy-brown.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, North-western Victoria, South Australia, Central Australia, Western Australia.



CHESTNUT-EARED FINCH.

THE Chestnut-eared or "Zebra" Finch is abundantly distributed, in suitable situations, over nearly the whole of the inland portions of the Australian Continent. Although the commonest species of Finch in Western New South Wales, it is greatly influenced in the localities it frequents by climatic conditions. Wherever there is a good rainfall and consequent profusion of grasses and herbaceous plants, the seeds of which constitute its food, these birds are extremely numerous, and its presence is a sure indication of water being near at hand, which may be found by noting the direction taken by the flocks on the way to their drinking place. In dry seasons it is

usually met with in small scattered flocks. During the protracted drought of 1896 these birds were driven to some of the coastal districts of the State, and remained to breed where previously they had never been observed. Open grassy plains, studded here and there with trees and clumps of low and wide-spreading bushes, are its favourite haunts. I found it very abundant at Tyree Station, on the Gwydir River, breeding in company with *Stictoptera bichenovii*. It was also fairly numerous near Moree, and I saw and examined several of their nests, which contained eggs and young, in shrubs and trees in Mr. C. J. McMaster's garden at "Wilga."

Writing of his experience of *Taniopygia castanotis* in the neighbourhood of the De Grey and Coongan Rivers, in North-western Australia, while collecting there on behalf of Mr. H. L. White, of Belltrees, Scone, New South Wales, Mr. F. Lawson Whitlock remarks:—"The Chestnut-eared Finch is fairly common in the neighbourhood, but is never found far from water. In particular it haunts the vicinity of wells provided with automatically fed sheep troughs. Old nests of this species are much in evidence; three or four are not uncommonly found in the same bush. I found one also in a hollow spout of a gum tree, with the remarkable number of twenty fresh eggs."

From Bimbi, Duaringa, Queensland, Mr. H. G. Barnard sends me the following notes:—" *Taniopygia castanotis* breeds in bushy shrubs or in the top of a hollow stump; clutch four to six eggs; the height of the nest sent was six feet from the ground. I may here state that most Finches roost at night in old nests, except when breeding, when the female only roosts in the nest with the eggs; all I have caught then have always proved to be females. About two years ago, just after a shower of rain, I noticed a lot of Finches kept flying out of the grass and catching something in the air; on inspection it proved to be winged *Termites*, and on shooting some of the birds I found their crops full of the ants. The Finches were *Taniopygia castanotis* and *Stictoptera bichenovii*. The nest taken by Mr. H. G. Barnard is rounded oval in form, with a large entrance in the side, and is composed throughout of very fine dried grasses. It is thin walled, and measures externally six inches in length by four and a half inches in breadth, and is built between several thin upright forked branches of a shrub.

From Burrenbella, South-western Queensland, Mr. S. Robinson writes me:—" *Taniopygia castanotis* breeds all the year round, and almost anywhere, in hollow pipes, bushes and vines. At present, 17th March, 1907, they are breeding in the rafters of the woolshed. They generally lay five or six eggs, and sometimes start to build again in the same bush before their young ones are able to fly."

Mr. Thos. P. Austin sends the following notes from Cobborah Station, Cobbara, New South Wales:—"During my ten years residence in these parts, *Taniopygia castanotis* first appeared here in 1908. They arrived in very large flocks in July and August, and although a few have remained up till the present time (19th February, 1909), I have not noticed any breeding here. One evening I saw a male bird enter a hollow bough; upon giving it a hit with a tomahawk, out flew about a dozen of these little birds. I cut the bough open, and found in it an old nest of *Chimacteris scandens*. These birds cannot go very long without water, and when going for a drink they prefer to settle upon a dead branch projecting out of the water; this they hop down, take one sip, and fly off immediately. While fishing in the Talbragar River, I have often watched them drinking in this way within a few yards of me."

From Broken Hill, South-western New South Wales, Dr. W. Macgillivray has kindly sent the following notes:—" *Taniopygia castanotis* is our only Finch, and is common throughout the district. I first found it nesting on 5th May, 1901, in a Mulga, one nest with fresh eggs in it. On 12th May, 1901, I found many of their nests in prickly Acacia bushes, containing young birds and eggs, near a large dam; some were also building. On 9th June, 1901, I noted that all Finch nests were empty, nesting evidently being over. On 4th August, 1901, I noted that Chestnut-

eared Finches were again nesting. On 11th August, 1901, two pairs of Finches were building underneath a Wedge-tailed Eagle's nest, on which the Eagle was sitting; a pair of *Xerophila leucopsis* had also built there. On 13th October, 1901, while looking for *Cheramaca leucosternum* nests, I saw a Chestnut-eared Finch fly out of a rabbit burrow, and on investigating the burrow I could see some straw. I dug it out, and found a perfectly constructed and lined nest eighteen inches from the entrance, with the hen bird sitting on five eggs. On the same morning I found a Crow's (*Corvus coronoides*) nest in a Mulga, about fifteen feet from the ground, containing four eggs, from which the bird flew on my approach. A pair of Chestnut-eared Finches were building a nest under the Crow's, and partly into it. In similar situations I have found them under the nests of the Little Eagle and Whistling Eagle. They nest in either the Autumn or Spring. I have found nests in March, April and May in numbers, and in August, September, October and November."

Mr. G. A. Kearthland also sends me the following notes:—"Chestnut-eared Finches are numerous throughout Central Australia, the Northern Territory, Western and North Western Australia. The members of the Horn Scientific Expedition to the West Macdonnell Ranges saw them at every watering place from the time they left Oodnadatta until their return there. The same may be said of the Calvert Exploring Expedition across Western and North-western Australia. They were seen from Geraldton to Derby, and as we steamed past Broome in the 'Australind' several pairs, in company with a like number of Painted Finches (*Emblema picta*) followed the vessel for some distance, occasionally perching in the rigging. The Chestnut-eared Finch is regarded by many bushmen as a good indicator of water. They are great drinkers, and soon after sunrise they resort to the nearest pool or well, where they spend the day, returning to their camping ground towards sunset. Whether they can scent the fluid, as some assert, is perhaps doubtful, but at a lunch camp in the desert the members of the Calvert Exploring Expedition were surprised to see a flock of Chestnut-eared Finches alight on the water carts, and afterwards drink from a pannikin placed for them. They generally build their nests of harsh dry grass stalks, about four inches long, in all sorts of places. I have found them on the ground beneath a prostrate bush, on desert gums over thirty feet from the ground, and in hollow logs. At Alice Springs in 1894 I saw a nest containing eggs on the shelf of the blacksmith's shop, and the brood were hatched and reared notwithstanding that a large amount of horse-shoeing was done close by. Two nests were hidden in a pile of debris left by a flood. Near the Fitzroy River one bird built its nest inside a bleached bullock's skull lying on the ground. Close to the camel depôt near Lake Augusta, Mr. L. A. Wells found one egg of the Chestnut-eared Finch in the nest of the Crested Wedge-bill. On visiting the nest day after day, I saw the structure roofed over and finished, and the full complement of eggs laid. During our stay in that locality a pair of these birds built their nest in our bough shade, and although the birds were frequently handled by the Afghans, they stuck to their nest, and laid and hatched their brood before we left. Unlike most birds, the Chestnut-eared Finch uses its nest as a sleeping place. Sometimes a many as a dozen nests are seen on one bush."

Dr. A. M. Morgan writes me:—"I have met with *Taniopygia castanotis* from Adelaide to as far north as I have been—the Mount Gunson District. Old residents have told me that formerly there were none of these birds as far south as Adelaide, so these may be the progeny of escaped cage birds. They are, at any rate, common enough about Glenelg and Henley Beach, and breed there freely. A set of six eggs in my collection was taken at the Grange in September, 1897, and I saw a nest, with eggs in it, at the golf links at Glenelg about the end of December, 1903; it was built in a dead and dried-up thistle. From Laura northwards they are the commonest Finch, being present in flocks wherever there is water, and also about homesteads. They usually breed in companies, and I have seen ten nests in one prickly Acacia bush near Laura. The thatch of outhouses and brush fences are favourite nesting places. They lay from five to

nine eggs for a sitting, and in the north do not appear to have any regular breeding season. About Adelaide this species usually breeds from September to the end of December. These birds use their old nests for roosting places after the young have left: they also build shelters resembling their nests, but of much lighter construction. At Concupidney, on the 4th August, 1902, I saw a pair which had built themselves a shelter inside an old nest of *Pomatostomus superciliosus*."

It breeds in companies, usually in low bushes, several nests frequently being found in the same bush. Hollow spouts are also resorted to, and in common with several other small species of birds, underneath the nest of a Crow, Hawk, or Eagle. Almost any situation is availed of, and many curious nesting sites have been recorded.



NESTING SITE OF CHESTNUT-EARED FINCH.

During September, 1896, Mr. George Savidge observed it for the first time in the Upper Clarence District, and forwarded me the skin of a female which he had caught in the nest. The nest, formed of dried grasses, was placed with three others inside a nest of Termites, on the trunk of a dead *Eucalyptus*, about fourteen feet from the ground. All the Finches' nests had a separate entrance in the ant-bed, and several full sets of fresh eggs were obtained. Mr. Savidge forwarded me a photograph of this unusual nesting site, and which is here reproduced. The burrows in the ant-bed were probably old nesting places of Macleay's Kingfisher. During the severe inland drought in 1896, this species was noted for the first time by Mr. A. C. Ivatt, at Glanmire, near Bathurst. Specimens were also obtained at Campbelltown and Belmore, in the neighbourhood of Sydney, and a nest containing fresh eggs was taken in the latter locality in September. During a drought in Queensland Mr. A. F. Smith informs me that he observed numbers of these birds at Ingham, on the Herbert River, and about fifteen miles from the coast. At Melville, Western Australia, Mme. Octave Le Bon informed me that a pair of these birds built their nest inside a rusty old tin lying on the ground near her house.

The eggs are usually five or six in number for a sitting, and of a faint bluish-white colour; they are oval in form, the shell being close-grained, smooth and lustreless. A set of six taken by Mr.

James Ramsay at Tyndarie in October, 1879, measures:—Length (A) 0·6 × 0·43 inches; (B) 0·61 × 0·45 inches; (C) 0·66 × 0·42 inches; (D) 0·62 × 0·43 inches; (E) 0·66 × 0·46 inches; (F) 0·65 × 0·45 inches. A set of five I took from a nest built in a tree in Mr. C. J. McMaster's garden at "Wilga," near Moree, on the 9th November, 1897, measures:—Length (A) 0·6 × 0·45 inches; (B) 0·6 × 0·45 inches; (C) 0·62 × 0·45 inches; (D) 0·63 × 0·45 inches; (E) 0·66 × 0·46 inches.

Young birds resemble the adult female, but have the centre of the head greyish-brown, the chin and throat being of a clearer grey; remainder of the under surface white with a fulvous wash,

which is more pronounced on the lower sides of the body and the under tail-coverts. Wing 1.95 inches.

As has already been pointed out, the Chestnut-eared Finch breeds in Western New South Wales in Spring and again in Autumn, and in some places all the year round. Numbers of these birds are trapped annually, and being a hardy species they thrive well and breed freely in confinement, and rear their young without requiring any special attention beyond keeping them well supplied with seed, water, a few bushy branches, and plenty of thin dried plant stems and grasses to form their nests. In confinement their nests are not, as a rule, so well built as when in a wild state. Several broods are reared in the same nest, the old birds frequently starting to re-line the nest before the young ones who have just left it are barely able to fly. They breed at all times of the year. In an aviary Dr. E. P. Ramsay had at the Australian Museum, a brood of young left the nest on the 3rd June, 1887; it was the third brood of the same pair of birds since January.

Genus STICTOPTERA, Reichenbach.

Stictoptera bichenovii.

BICHENO'S FINCH.

Fringilla bichenovii, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 258 (1827).

Estrela bichenovii, Gould, Bds. Austr., fol. Vol. III., pl. 80 (1848).

Stictoptera bichenovii, Gould, Handb. Bds. Austr., Vol. I., p. 409 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 313 (1890).

ADULT MALE—*General colour above, including the crown of the head, pale brown, with numerous indistinct darker brown cross-lines; bar across the rump black; upper tail-coverts pure white, some of the lower and partially concealed ones, black; lesser and medium upper wing-coverts like the back; greater coverts and quills brownish-black spotted with white; tail black; lores, feathers above the eye, cheeks, ear-coverts, chin and throat pure white, bordered around with a narrow black line, which widens out on the forehead into a wide black band; foreneck and chest white, slightly tinged in the centre, and washed with brown on the sides of the chest, followed by a second and broader black cross-band; remainder of the under surface white with a faint creamy buff wash; under tail-coverts black; bill light slate colour; legs and feet grey; iris black. Total length in the flesh 4.25 inches, wing 2.15, tail 1.6, bill 0.38, tarsus 0.57.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland, New South Wales.



BICHENO'S FINCH.

THE present species was described by Vigers and Horsfield in the Transactions of the Linnean Society of London,* from specimens collected by Mr. Brown at Shoalwater Bay and Broad Sound, Queensland, in September 1802. Its range extends over the greater part of Queensland and the inland portions of the northern half of New South Wales. This Finch, the "Double-bar" of Sydney bird dealers, is another instance of a species being found in the coastal as well as the inland districts of Queensland, while in New South Wales, where it is far less common, it is strictly confined to the inland portions of the State. Among a number of specimens in the Australian Museum collection, there are examples obtained in

* Trans. Linn. Soc., Vol. XV., p. 258 (1827.)

Queensland by Mr. George Masters at Gayndah, Burnett River, in September, 1870, and by the late Mr. George Barnard at Duaringa, on the Dawson River. The large numbers of these birds one may see in the dealers' shops in Sydney are, I am informed, mostly sent by way of Rockhampton. In North-western New South Wales I obtained specimens on the Gwydir River, about seventy miles from the Queensland border; also near Moree, where it was breeding in Mr. C. J. McMaster's garden at "Wilga." Farther south and west Mr. R. Grant procured specimens on Buckinguy Station, near Warren; also Mr. J. Hearne obtained examples near Dubbo.

In the "Catalogue of Birds in the British Museum"³ Dr. R. B. Sharpe also records specimens from North-western Australia. I have never seen a specimen in any collection, or living examples from that part of the Continent.

A nest taken by Mr. H. G. Barnard, in his garden at Bimbi, Duaringa, Queensland, is almost spherical in form, with a projecting entrance formed, as is the entire structure, of thin dried grasses, the interior being lined with fowls' feathers. It averages six inches in breadth from back to front, by four inches in height, by one inch and three quarters across the entrance. It is built between many thin upright forked branches of a shrub. At Moree I found nests built at a height from four to twelve feet from the ground.

Mr. H. G. Barnard sends the following note:—"Stictoptera bichenovii generally breeds in bushy shrubs from four to ten feet from the ground; clutch, five to six. The Narrow-billed Bronze Cuckoo (*Chalcococcyx basalix*) is fond of this bird as a foster-parent, as in one season I took three eggs from three nests of this Finch, but I have never seen the Finches feeding a young Cuckoo. The height of the nest forwarded was four feet from the ground."

The eggs are usually five, sometimes six, in number for a sitting, oval in form, and of a dull lustreless white. A set of four taken by Mr. H. G. Barnard, at Coomobolaroo, Duaringa, Queensland, on the 25th February, 1893, measures:—Length (A) 0·6 × 0·42 inches; (B) 0·5 × 0·42 inches; (C) 0·55 × 0·41 inches; (D) 0·57 × 0·41 inches. Another set of five measures:—Length (A) 0·58 × 0·48 inches; (B) 0·56 × 0·4 inches; (C) 0·6 × 0·4 inches; (D) 0·62 × 0·43 inches; (E) 0·57 × 0·43 inches. A set of six, taken by Mr. H. G. Barnard at Bimbi, Duaringa, Queensland, on the 6th May, 1908, measures:—Length (A) 0·58 × 0·47 inches; (B) 0·58 × 0·43 inches; (C) 0·56 × 0·43 inches; (D) 0·58 × 0·44 inches; (E) 0·57 × 0·45 inches; (F) 0·6 × 0·43 inches.

In Northern New South Wales this species breeds during October and the three following months. On the Dawson River, Queensland, Mr. H. G. Barnard informs me it commences to breed after the rain, generally in February, and usually continues until June.

Stictoptera annulosa.

RINGED FINCH.

Amadina annulosa, Gould, Proc. Zool. Soc., 1839, p. 143.

Estrelida annulosa, Gould, Bds. Austr., fol. Vol. III., pl. 81 (1848).

Stictoptera annulosa, Gould, Handbk. Bds. Austr., Vol. I., p. 410 (1865); Sharpe, Cat. Bds. Brit.

Mus., Vol. XIII., p. 314 (1890); North, Proc. Linn. Soc. N. S. Wales, Vol. III., 2nd ser., p. 146 (1888).

ADULT MALE—Similar to the adult male of *STICTOPTERA BICHENOVII*, but having the rump and upper tail-coverts entirely black; bill light leaden-grey; legs and feet leaden-grey; iris black. Total length 4 inches, wing 2, tail 1·8, bill 0·38, tarsus 0·55.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-western Australia, Northern Territory of South Australia.

³ Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 314 1860.

THE Ringed Finch is the representative in the North-western and Northern portions of the Australian Continent of the preceding species, to which it is closely allied. The late Mr. T. H. Bowyer-Bower and Mr. E. J. Cairn obtained a number of specimens near Derby, North-western Australia, in 1886. On the 2nd October, 1887, Mr. W. W. Froggatt, collecting on behalf of the late Sir William Macleay, procured its nest and eggs near the head of the Lennard River, and these I subsequently described at a meeting of the Linnean Society of New South Wales,* and Mr. G. A. Keartland, while a member of the Calvert Exploring Expedition, procured examples near the junction of the Fitzroy and Margaret Rivers, and obtained its nest and eggs. There are specimens also in the Australian Museum, collected in different parts of the Northern Territory of South Australia. Mr. A. Zietz, the Assistant Director of the South Australian Museum, informs me that in a collection of birds' skins made by Mr. F. Schultze in the Northern Territory, and received at the Museum in March, 1870, there were eight of these Finches. Dr. E. Hartert has also recorded an adult female from Crawford's Springs, in the same part of the continent. †

M. Octave Le Bon informs me that he took a large number of living birds to Antwerp in 1897. Among them were over two hundred of this species. He caught them at Goose Hill, about twelve miles from Wyndham, North-western Australia.

Mr. G. A. Keartland sends me the following note :—“ *Stictoptera annulosa* builds a round ball-like nest of dead grass strippings, rather coarse on the outside, but lined with ‘silver grass.’ The first I saw was near the Fitzroy River, North-western Australia, in February, 1897. It was placed in a suspended dead branch of a Eucalypt, about eight feet from the ground. It contained five white eggs, similar in size to those of *Tæniopygia castanotis*. Three other nests were found in a species of thorny Acacia Bush, about three feet six inches in height : two contained eggs, but the third was scarcely finished. They were all built of the same material.”

The eggs are usually four or five in number for a sitting, oval in form, the shell being close-grained, smooth and lustreless. They are white, or white with an almost imperceptible tinge of blue. Three eggs in the Macleay Museum, at the University of Sydney, measure alike 0·55 × 0·44 inches. A set of four taken by Mr. G. A. Keartland, from a dome-shaped nest of dried grasses, in March 1897, near the junction of the Fitzroy and Margaret Rivers, North-western Australia, and in which he caught the bird, measures :—Length (A) 0·55 × 0·4 inches; (B) 0·55 × 0·38 inches; (C) 0·54 × 0·4 inches; (D) 0·55 × 0·4 inches. The egg of this Finch is one of the smallest of all of our Australian Birds.

Genus MUNIA, *Hodgson*.

Munia castaneithorax.

CHESTNUT-BREADED FINCH.

Amalina castaneithorax, Gould, Syn. Bds. Austr., Part II., (1837).

Donacola castaneithorax, Gould, Bds. Austr., fol. Vol. III., pl. 94 (1848); *id.*, Hand-bk. Bds. Austr., Vol. I., p. 426 (1865).

Munia castaneithorax, Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 340 (1890).

ADULT MALE—*General colour above including the wings cinnamon-brown, the feathers of the back having ashy tips; rump and upper tail-coverts orange-yellow; central pair of tail feathers straw-colour, the remainder brown; forehead, crown of the head, nape and hind neck ashy-grey, with brown centres to most of the feathers; lores, a narrow line of feathers over the eye, sides of face, ear-coverts, cheeks and throat blackish, with narrow brown shaft lines, which are more distinct on the ear-coverts;*

* Proc. Linn. Soc. N. S. Wales, Vol. III., 2nd Ser., p. 146 (1888). † Nov. Zool., Vol. XII., p. 238 (1905).

fore neck and chest pale cinnamon, followed by a black band; remainder of under surface white, some of the feathers on the sides of the body cinnamon; black on their apical portion, with a broad white cross-bar near the tip; flanks and under tail-coverts black; bill, slate-colour; legs and feet grey; iris brown. Total length in the flesh 4·5 inches, wing 2·1, tail 1·5, bill 0·35, tarsus 0·55.

ADULT FEMALE—Similar in plumage to the male, but paler on the upper parts and on the fore neck and chest.

Distribution—Northern Territory of South Australia, Queensland, New South Wales, Islands of Torres Strait.

THE Chestnut-breasted Finch is an inhabitant of the coastal districts of the Northern Territory of South Australia, Queensland and Northern New South Wales: also, some of the islands of Torres Strait. It is extremely abundant in the neighbourhood of Port Darwin, from whence I have seen in Sydney many hundreds of birds caught by Mr. J. D. Young, a bird-trapper. In the Australian Museum collection there are specimens obtained at Cape York, Cooktown, Cardwell, Port Darwin, and Wide Bay, in Queensland. There is also a number of specimens from the northern coastal rivers of New South Wales, over which it appears to be generally distributed. I observed small flocks at Ourimbah in 1902, and in April, 1906, Mr. A. F. B. Hull found several nests with eggs and young at Manly, near Sydney.



CHESTNUT-BREADED FINCH.

It chiefly frequents reed and rush-bordered river sides, rank grass flats and cultivated crops. In the Upper Clarence District, where I met with this species in November, 1898, it assembles in large flocks, and is very destructive on farms, eating onion, lucerne and barley seed.

There is but little variation in colour in a number of adult specimens before me, obtained in widely separated localities; principally it is in the depth of colour of the rump and upper tail-coverts, some being paler than others. The specimen having these parts

darker and more richly coloured is a fine old adult male in the collection obtained by Mr. George Masters at Wide Bay, Queensland, in October, 1867. Some specimens have narrow ashy tips to the cinnamon feathers on the fore neck and chest.

Mr. Frank Hislop writes me as follows:—"In the Bloomfield River District, North-eastern Queensland, the Chestnut-breasted Finch usually builds in the long flag grass. It first starts the nest by splitting a lot of the blades of flag grass into thin strips, without breaking them off the stalk, and bends them over so as to form a bunch, into which they make an entrance, and line it inside with different kinds of grasses, obtained at some distance from the nest. The structure is made almost entirely of flag grass, and five eggs are usually laid for a sitting."

While resident at Ripple Creek, Herbert River, Queensland, Mr. J. A. Boyd sent me the following note:—"On the 6th December, 1890, I took a nest of *Donacola castaneithorax* containing four fresh eggs. It was built in Blady-grass and formed of similar material, finer grasses being used as a lining."

From Bimbi, Daringa, Queensland, Mr. H. G. Barnard writes me as follows:—" *Munia castaneithorax* was a very common bird in these parts, but since the late droughts they are rather scarce. I may state that when at Somerset, Cape York, I found these birds breeding in March, 1897. I do not think the Finches have any fixed time for breeding in this district, being guided

by the seasons and breeding whenever there is an abundance of grass seed, as for instance in 1903, after the great drought, they commenced breeding in May and bred right through the winter, and up to December, when a dry spell coming on they stopped for a time; but rain falling again in February, 1904, they bred in March and April."



NEST OF CHESTNUT-BREADED FINCH.

Mr. George Savidge sends me the following notes from Copmanhurst, New South Wales :—
 "The Chestnut-breasted Finch may be found breeding here throughout the year; I took a set of five fresh eggs at the end of April. It congregates in large flocks in winter, is very fond of barley seed, hence its local name "Barley Bird."

The nest is a large, loosely-built, dome-shaped structure, outwardly formed of coarse dried grasses, and lined inside with fine dried grass, the entrance being protected with a hood several inches in length. In one now before me, the base of the nest is built of the thin dried strips of the sheaths of maize stalks, the remainder of it being composed wholly of the dried grass-like covering of the maize cobs, and with a slight lining at the bottom of the nest of very fine dried grasses. It measures externally eight inches and a half in length by five inches and a half in breadth, the entrance one inch and a half, and the protecting hood over it four inches. This, and another similar nest sent by Mr. Savidge, were built among some dead maize stalks, about two feet from the ground. Usually the nests are built in long rank grass. In the Upper Clarence District they are generally found in the Blady Grass. The nest

here figured is reproduced from a photograph sent by Mr. Savidge.

The eggs are pure white, usually five, sometimes six, in number for a sitting, oval in form, the shell being close-grained, smooth and almost lustreless. A set of five measures :—Length (A) 0.66 × 0.45 inches; (B) 0.68 × 0.47 inches; (C) 0.67 × 0.46 inches; (D) 0.66 × 0.43 inches; (E) 0.7 × 0.45 inches.

Young birds are brown above, including the head; rump, fulvous; upper tail-coverts, straw colour; throat, dull ashy-white; fore neck and chest, fulvous-brown; remainder of the under surface white with a fulvous-brown wash, which is more pronounced on the under tail-coverts. The wing nearly equals that of the adult, 2·1 inches.

Immature birds resemble the adult, but are duller in colour, most of the feathers on the upper parts, including the head, having ashy-white margins; throat ashy-white, some of the feathers with black tips; fore neck pale cinnamon, the succeeding black band broken and ill-defined, and much higher up the body than in the adult; remainder of the under surface dull white, with a faint fulvous wash; some of the longest under tail-coverts blackish. Wing measurement the same as young, 2·1 inches.

In some seasons nidification commences as early as October, but during my visit to the Upper Clarence, in November, 1898, this species had not started to build, nests with eggs being more common during the following January, February and March, and some nests had fresh eggs as late as the end of April. Normally, in this district, the breeding season commences at the end of October, and lasts until the end of March, but Mr. Savidge says nests may be found throughout the year.

Munia xanthopyrma.

YELLOW-RUMPED FINCH.

Donacola flavipyrma, Gould, Proc. Zool. Soc., 1845, p. 80 (*var hybrida*); *id.*, Bds. Austr., fol. Vol. III., pl. 96 (1848).

Munia flavipyrma, Gould, Handbk. Bds. Austr., Vol. I., p. 428 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 346 (1890); North, Proc. Linn. Soc. N. S. Wales, Vol. XXIX., p. 130 (1904).

Munia xanthopyrma, Mathews, Hand-l. Bds. Austr., p. 102 (1908).

ADULT MALE—*General colour above chestnut-brown; upper wing-coverts and innermost secondaries like the back: quills dusky-brown externally edged with chestnut, which is less distinct on the outer primaries: rump and upper tail-coverts rich yellow with a reddish-ochreous wash, which is more pronounced on the rump; central pair of tail feathers golden-straw colour, except near the shaft, the remainder externally edged with a slightly duller shade on their outer webs; forehead, crown of the head and hind neck dull grey, inclining to whitish on the sides of the head, the ear-coverts and cheeks being slightly tinged with creamy-buff; remainder of the under surface creamy-buff, washed with fawn colour on the breast; lower part of the abdomen whitish, faintly tinged with creamy buff; under tail-coverts black; bill leaden-grey; legs and feet leaden-grey; iris dark brown. Total length in the flesh 4·5 inches, wing 2·2, tail 1·4, bill 0·5, tarsus 0·62.*

ADULT FEMALE—*Similar in plumage to the male, but slightly paler on the under parts.*

Distribution—North-western Australia, Northern Territory of South Australia.

THE type of this species was described by Gould in 1845, from a single specimen procured by Mr. Bynoe, near the Victoria River, in the Northern Territory of South Australia, during the surveying voyage of H.M.S. "Beagle." In the same locality the late Mr. M. Elsey obtained a specimen in 1856. For many years it was a *rara avis*; the first time I heard of its re-discovery was in 1895, when M. Octave Le Bon informed me that his former partner, M. Etable, had that year trapped eight pairs in the Northern Territory of South Australia, which he had taken with many other birds to Europe, and disposed of them at Antwerp. M. Le Bon informs me that he saw large flocks of these birds about eighteen miles from Wyndham, North-western Australia. They were frequenting the coarse cane-grass growing

on the margins of swamps. Several of these Finches were received by Sydney bird dealers, by way of Port Darwin, in 1903, Mr. H. E. Peir presenting a specimen to the Trustees of the Australian Museum that had died in captivity in September of that year. Early in March, 1904, another of these Finches in Mr. Peir's possession died, and was presented to this collection. About the same time a living example was purchased by the Trustees from M. Le Bon, to which I drew attention when exhibiting a skin of this species at a meeting of the Linnean Society of New South Wales, on the 27th April, 1904. This bird was received among a number of other species, consisting chiefly of *Munia castaneithorax*, from Port Darwin, in December 1903. It lived until the 6th June, 1904, and is now a specimen in the Australian Museum collection. Since that time living examples of these Finches have become more common, many being sent to London in 1904, and again in larger numbers in 1905. Dr. Ernst Hartert also recorded two specimens from the Victoria River in 1905.† In February, 1909, I saw about twelve living birds in the possession of Mr. Fritz Kruger in Sydney, brought with a number of other species procured from Port Darwin, in the Northern Territory of South Australia.

Of its mode of nidification in a state of nature I know nothing beyond that recorded, in a general way, by the late Mr. M. Elsey when writing to Gould from the Victoria River Depot † in June, 1856:—"There are two *Donacola* (*D.*) *flaviprymna*, and a crimson and brown one. . . . The *Donacola* build in some parts in low tea-trees overhanging water, making a large spouted nest, with a small cavity, of dry bark of tea-trees, and *Pandanus*. . . . They all lay six white eggs."

This species has bred in confinement in England, an interesting account of which is given by Mr. W. E. Teschemaker in the pages of the "Avicultural Magazine." The egg of this species is oval in form, pure white and slightly lustrous, and measures:—Length 0·67 × 0·38 inches.

Several of these Finches have acquired abnormal plumage in confinement, Mr. D. Seth Smith exhibiting one of these specimens at a meeting of the British Ornithologists' Club on the 16th January, 1907, § which showed distinct traces of the dark throat and pectoral band characteristic of *Munia castaneithorax*.

All of the specimens in the Australian Museum collection have the throat and the remainder of the under surface uniform creamy-buff, washed with fawn colour, being whitish on the centre of the abdomen. From Gould's figure, in his folio edition of the "Birds of Australia," they differ principally in having the head greyer, paler on the sides, and the rump and upper tail-coverts more of a reddish-ochre hue, especially the upper part of the rump.

Munia pectoralis.

WHITE-BREASTED FINCH.

Donacola pectoralis, Gould, Bds. Austr., fol. Vol. III., pl. 95 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 427 (1865).

Munia pectoralis, Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 354 (1890); North, Vict. Nat., Vol. XVI., p. 12 (1899).

ADULT MALE—General colour above, including the forehead and crown of the head, greyish-brown; quills brown, paler on their outer webs, whitish-brown around their tips; upper wing-coverts browner, with a minute white dot at the tip; tail feathers dusky-brown; lores black; sides of face, ear-coverts and throat glossy purplish-black; a fawn line extends from the sides of the forehead over the eye on to the sides of the neck, where it is much broader, and slightly richer in colour; band on the fore neck white, the feathers having a subterminal black bar, which is concealed except at the sides; remainder of the under surface light vinaceous-brown, some of the feathers on the sides of the body

* Proc. Linn. Soc. N. S. Wales, Vol. XXIX., p. 58 (1904).

† Proc. Zool. Soc., 1857, p. 26.

‡ Nov. Zool., Vol. XII., p. 239 (1905).

§ Bull. Brit. Orn. Club, Vol. XIX., p. 38 (1907).

having a white bar near the tip, bordered on either side with a narrow black line; under tail-coverts light vinaceous brown, with a dusky wash on the apical portion, which has an ill defined cross-bar and broad tip of dull white; bill ashy-grey; legs and feet flesh colour; iris dark brown. Total length in the flesh 4¼ inches, wing 2.3, tail 1.5, bill 0.4, tarsus 0.63.

ADULT FEMALE—Similar in plumage to the male, but the feathers on the sides of the face, ear-coverts and throat of a brownish-black, and those on the fore neck black with narrower white tips, revealing their black sub-apical portion, and giving this part a black and white barred appearance.

Distribution—North-western Australia, Northern Territory of South Australia, Northern Queensland.

THE White-breasted Finch is an inhabitant of North-western Australia, the Northern Territory of South Australia and the Gulf District of Queensland. Mr. E. J. Cairn obtained several specimens near Derby in 1886; so, likewise, did the late Mr. T. H. Bowyer-Bower. Mr. G. A. Kearnland procured an adult male and female near the junction of the Fitzroy and Margaret Rivers, while a member of the Calvert Exploring Expedition in 1897. I have seen a number of living birds in Sydney that were trapped about eight miles from Port Darwin. Dr. E. P. Ramsay has also recorded it from the Gulf District of Queensland, from specimens procured there by Mr. Gulliver. Since Gould described the type in 1839, up to 1886, when Mr. Cairn and the late Mr. T. H. Bowyer-Bower obtained specimens near Derby, it was looked upon as a rare species, and even in 1894 the British Museum had only a single specimen, when Dr. R. B. Sharpe prepared Volume XIII. of the "Catalogue of Birds in the British Museum."

M. Octave Le Bon, who during the past twenty years has spent the greater part of his time in trapping birds in many parts of Australia, and paying periodical visits to Europe with his captures, informs me that in Northern Queensland he trapped about two hundred of these birds about forty miles west of Charters Towers, in October 1906, more being caught about ten miles from Croydon. In North-western Australia he observed them in immense flocks, six miles from Wyndham. The largest number he ever caught at one pull of the trap was about one hundred and fifty. These birds are known to dealers as "Picturellas," a corruption of the specific name *pectoralis*. They are very wild, easily take fright, and when first captured do not take kindly to confinement. They were always found about creeks, clay pans, and muddy sides of waterholes, the young birds being very fond of feeding on a green sedge left by subsiding waters.

The following is taken from my description published in the "Victorian Naturalist" in May 1899:—"A nest of *Munia pectoralis*, found near the junction of the Fitzroy and Margaret Rivers, North-western Australia, by Mr. Kearnland at the latter end of February, 1897, was a flask-shaped structure, outwardly formed of very coarse grass stalks, and neatly lined inside with the finest "silver-grass." It contained four eggs, and was built in a shrub, about ten feet from the ground. The eggs are elongate oval in form, white with a faint bluish tinge, the surface of the shell being smooth and lustreless, and measures:—Length (A) 0.65 × 0.43 inches; (B) 0.64 × 0.42 inches; (C) 0.64 × 0.42 inches; (D) 0.62 × 0.43 inches.

Young birds are brown above, upper wing-coverts like the back, quills dusky brown externally edged with fulvous brown, the inner webs of the secondaries broadly margined with fulvous; tail feathers dusky-brown; head brown; lores blackish; ear-coverts dark brown; throat creamy-brown with a few blackish feathers on the upper part; remainder of the under surface light creamy-brown with a vinaceous wash, which is more pronounced on some specimens than others, even from the same nest; on the fore neck are some scattered black feathers with large white tips. Wing 2.2 inches.

Immature birds resemble the adult female, and have the sides of the face, ear-coverts and throat brownish-black. Wing 2.4 inches.

Genus **AIDEMOSYNE**, Reichenbach.**Aidemosyne modesta.**

PLAIN-COLOURED FINCH.

Amadina modesta, Gould, Proc. Zool. Soc., 1836, p. 105; *id.*, Bds. Austr., fol. Vol. III, pl. 85 (1848).
Aidemosyne modesta, Gould, Handbk. Bds. Austr., Vol. I., p. 414 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII, p. 368 (1890).

ADULT MALE—*General colour above brown, the rump feathers with a white cross-bar and tip; the upper tail-coverts slightly darker, with similar markings, but more spot-like in character; upper wing-coverts like the back, and having a white spot at their tips; quills brown, the apical portion of the secondaries externally edged with white, the innermost with a white bar at the tips of their outer webs; tail blackish, the outer feathers with a spot of white at the tip; fore part of head dark claret-red; lores black; ear-coverts white, barred with brown; cheeks white with only slight indications of brown cross-bars or tips; a rounded oval spot on the chin and upper throat apparently black, but when held in sunlight it is similar to the fore part of the head, claret red, but of a darker shade; remainder of the under surface white, transversely barred with pale brown; centre of the breast, abdomen and under tail-coverts white; bill black, grey at sides; legs and feet fleshy brown; iris, brownish-black. Total length in the flesh 4.6 inches, wing 2.35, tail 2, bill 0.4, tarsus 0.6.*

ADULT FEMALE—*Similar in plumage to the male, but with less claret-red on the forehead, the tips of the feathers on the sides of the latter white, forming a line extending from the centre of the base of the upper mandible over the eye; chin and upper throat dull whitish, without any dark spot. Wing 2.1 inches.*

Distribution—Queensland, New South Wales.



PLAIN-COLOURED FINCH.

THE Plain-coloured Finch, or the more appropriately named "Plum-head" of Sydney bird dealers, is an inhabitant of the southern portion of Queensland and the northern half of New South Wales. From the former State there are specimens in the Australian Museum collection, obtained as far north as Port Denison by the late Mr. J. Rainbird in November, 1865; also, from the same locality, procured by Mr. George Masters in 1867; and the late Mr. George Barnard sent specimens for identification from Coomoo-boolaroo, Duaringa, on the Dawson River. In Northern New South Wales, in November, 1897, I found it frequenting, in company with *Stictopectera bichenovii*, large

open expanses near the Mehi River, covered with "Roley-Poley" bushes and Salt bush, and studded here and there with Wilga trees. Later on I observed it feeding in company with *Taniopygia castanotis*, in the luxuriant grasses and herbage near the Gwydir River, specimens being obtained in both localities. Although doubtless breeding at the time of my visit, I did not succeed in finding its nest. Gould observed it farther south, on the Namoi River, and on the Liverpool Plains. Mr. R. Grant obtained specimens on Buckinguy Station, near Warren, in Western New South Wales, and Mr. E. H. Lane informs me that he has on several occasions found it breeding in coarse tussocky grass, known as "Black-grass seed," also in "Swampy grass," on Wambangalang Station, about nineteen miles from Dubbo. Large numbers of these birds are trapped annually, but I am informed that those one sees in Sydney bird dealer's shops are all sent by way of Southern Queensland ports. Dr. Arthur G. Butler, in his "Foreign Finches in Captivity,"* calls this species the Cherry Finch, and remarks: "it is a charming and perfectly hardy little bird, capable of standing severe winters in an unheated aviary."

* Foreign Finches, p. 207 (1894-6.)

The nest is a dome-shaped structure composed of dried grasses, rather loosely put together, and thickly lined with feathers, and is always placed in a tussock of long grass.

The eggs are usually four or five in number for a sitting, pure white, oval in form, the shell being close-grained, smooth and lustreless. A set of five received from the late Mr. G. Barnard, and taken at Coomooboolaroo, Duaringa, Queensland, on the 9th September, 1889, measures:—Length (A) 0·64 × 0·45 inches; (B) 0·62 × 0·45 inches; (C) 0·6 × 0·47 inches; (D) 0·58 × 0·47 inches; (E) 0·62 × 0·46 inches. A set of four taken by Mr. H. G. Barnard, in the same locality, on the 25th February, 1893, measures:—Length (A) 0·62 × 0·45 inches; (B) 0·6 × 0·46 inches; (C) 0·58 × 0·46 inches; (D) 0·66 × 0·45 inches.

The breeding season of this species is regulated to a large extent by the season in Central Queensland, fresh eggs being taken in September and February. In New South Wales, Mr. E. H. Lane has taken eggs in September and October.

Genus *ÆGINTHA*. *Cabanis*.

Ægintha temporalis.

RED-EYEBROWED FINCH.

Fringilla temporalis, Lath., Ind. Orn., Suppl., p. xlvi. (1801).

Estrela temporalis, Gould, Bds. Austr., fol. Vol. III., pl. 82 (1848).

Ægintha temporalis, Gould, Handbk. Bds. Austr., Vol. I., p. 411 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 372 (1890).

ADULT MALE—*General colour above dull olive yellow, brighter at the sides of the hind neck; upper wing-coverts and inner secondaries like the back, quills dusky-brown externally edged with olive; rump and upper tail-coverts crimson; tail feathers dusky-brown; crown of the head and nape bluish-grey; lores and a superciliary stripe extending on to the sides of the nape crimson; throat, and under surface ashy-grey; the chin ashy-whitish; centre of the breast and abdomen pale buffy-brown; under tail-coverts ashy-grey, more or less washed with pale buffy-brown; bill blood-red, with a triangular-shaped black patch on the culmen and centre of lower mandible; legs and feet flesh colour; iris reddish-brown. Total length in the flesh 4·5 inches, wing 2, tail 1·8, bill 0·4, tarsus 0·55.*

ADULT FEMALE—*The sexes are alike in plumage.*

Distribution—Queensland, New South Wales, Victoria, South Australia.

THE range of the Red-eyebrowed Finch extends from the neighbourhood of Cooktown, in Queensland, throughout the greater portion of Eastern New South Wales, into Victoria and South Australia. It is abundantly distributed in favourable situations over the coastal districts, for which it evinces a decided preference.

Specimens now before me from Cairns, Cardwell and Wide Bay, Queensland, are similar to examples obtained in the neighbourhood of Sydney. Variation exists in the extent of the pale buffy-brown feathers on the centre of the breast and abdomen; also, on the buffy-brown or isabelline wash to the under tail-coverts; in some specimens the latter are entirely ashy-grey, like the sides of the body. Partial albinism is not uncommon. There is a young bird in the Australian Museum collection with the upper parts, including the head, dull yellowish-olive; the innermost secondaries like the back, remainder of quills white; upper tail-coverts dull crimson, central pair of tail feathers white, the lateral feathers dark brown; a few feathers on the nape white; chin, throat and centre of the breast white, fore neck and flanks dull yellowish-olive; bill black. Wing 1·9 inches.

Latham's *Fringilla temporalis*, of his "Index Ornithologicus,"¹ is founded on the "Temporal Finch" of his "General Synopsis of Birds."† As pointed out by Dr. Sharpe, Latham's description of the latter is taken from drawings, and the definition is uncertain, the under parts being described as white. It is somewhat remarkable that Gould, who knew this species well and accurately figures it in his folio edition of the "Birds of Australia," on the opposite page also describes the "under surface white." This *lapsus calami* evidently remained undetected by Gould, for it also occurs in his "Handbook of the Birds of Australia," printed many years after.

In New South Wales I have never heard any other name applied to this species than that of "Red-head," but in Dr. A. E. Butler's "Foreign Finches in Captivity," he there designates it the "Sydney Waxbill;" the latter half of this name I have sometimes heard it called in Victoria. Although apt to be confounded with *Zoneginthus bellus*, "Fire-tail" was another local name it was well known by to bird-nesting boys around Melbourne. Favourite haunts in the proximity of the latter city were the tea-tree swamps, close to the Yarra River, near Heidelberg and lower down at the mouth of Gardiner's Creek, near Toorak, where it entered the same river.

It is abundantly distributed near Sydney, giving preference to tea-tree scrubs, and low vine-covered trees bordering the sides of creeks intersecting well grassed lands; also open forest country with a light undergrowth.

Stomachs of these birds obtained in the neighbourhood of Sydney, usually contained grass-seeds in summer and autumn, and insects, with which were intermingled a few seeds of small wild fruits, in winter and early spring. "Red-head" trapping is a favourite pastime of boys in the neighbourhood of Sydney, and young trappers may be frequently met with about suburban railway stations, or in the bush. Wire cage-like structures, about a foot in length, with a captive call bird in one half and a spring trap baited with canary seed in the other, is the usual means of catching them. As previously pointed out, Whip-birds (*Psophodes crepitans*)‡ have been caught in the traps set for this species. Mr. R. V. Meikle, who brought me a Whip-bird so procured, is the only one that I have known to successfully breed the Red-eyebrowed Finch in captivity. He informed me that he trapped a pair of young Red-eye-browed Finches in 1904, and as he returned home late placed them in a large wire cage with a bandicoot. On the following morning he found one of them with its head off, in the grass nest of the bandicoot. The remaining one he kept for some time, and then using it as a call bird trapped another one, and put them both in an outside aviary, with some Canaries. One day all the birds escaped through the door being left open, and much to his surprise, although they had been free only about an hour, both of the Red-eyebrowed Finches were busy carrying grass into a low gum sapling in a garden opposite. He soon succeeded in trapping both again by the aid of some canary seed only as a lure. This was in October, 1905. On returning them to the aviary, he supplied the Finches with grass, and they formed a nest in a few days, laying six eggs therein, out of which four young ones were hatched and successfully reared. I saw these birds from the time of their nest-building until the young ones were fully fledged, and Canaries were breeding at the same time in the aviary. The old pair of birds are still alive, and are remarkably tame. With a twelve-doored trap and call bird, placed on a creek side under a dead Apple tree, Mr. Meikle informs me that in a deserted orchard at Roseville he succeeded in catching fourteen birds in twenty minutes out of a flock of about twenty in number. All the springs were released, eight of the compartments of the trap containing each a single bird, and three of them two birds in each. As a school boy at the time, he said he went home delighted with his trap full. As an instance of how tame these birds become, and attached to their owner, Mr. Meikle informs me one of his school fellows living near him used, in the summer months, to release a pair of these birds he had trapped, and had in confinement some time; every afternoon on arriving home from school, the birds returned again to the cage about 7.30 p.m.

* Ind. Orn., p. XLVIII. (1802.)

† Gen. Syn. Bds., Suppl. II., p. 211.

‡ Antea, Vol. I., p. 336.

The nest is a large flask-shaped structure, with a spout-like entrance composed of dried or partially green grasses, slightly lined inside at the bottom with finer grasses, and sometimes with thistle-down or feathers. They are of varying size, an average one measuring externally eight inches in length by five inches and a half in breadth. Tea-trees or low gum saplings are favourite nesting sites, especially those overrun with climbing plants, but any bushy bough is availed of when built in public parks and gardens. Prickly Acacia hedges are also much resorted to, the nest being usually placed from three to twenty feet from the ground, but eight to twelve feet is the average height. Being so large and easily found, they are seldom interfered with, except by bird-nesting boys, when they are built within hand's reach. About tea-tree swamps and scrub-bordered creeks they nest in companies, but single nests are more often met with in low trees in open forest lands. At Ourimbah they were found nesting in the crowns of tree-ferns.

Of many nests examined five is the average number of eggs laid for a sitting; sets of six are not uncommon, and occasionally up to seven and eight. The eggs are white, oval in form, some specimens tapering sharply at the smaller end; the shell is close-grained, smooth and lustreless. A set of six, taken at Roseville on the 3rd of November, 1907, measure as follows:—Length (A) 0·6 × 0·45 inches; (B) 0·62 × 0·47 inches; (C) 0·61 × 0·43 inches; (D) 0·62 × 0·42 inches; (E) 0·65 × 0·44 inches; (F) 0·62 × 0·45 inches.

Young birds resemble the adults, but have the head dusky yellowish-olive, and destitute of the crimson superciliary stripe; rump and upper tail-coverts dull crimson; the under parts are pale buffy-brown, sides of the body ashy-grey, washed with dull yellowish-olive; bill black. Wing 1·9 inches.

This Finch is not easily disturbed when breeding. At Belmore, in December 1893, I knew of a nest, built near the end of a low bushy branch, to be roughly pulled out by a youthful oologist, who could just reach it. Tearing the nest open and finding in it three fresh eggs, he worked the entrance together again as well as he could and replaced it. On examining it again five days later, he found in it the somewhat unusual complement of seven eggs. September until the end of January constitutes the normal breeding season in New South Wales, nests with eggs being more plentiful in October and November. Odd nests, however, may be found throughout the year. In 1892, at Middle Harbour, several nests were found with fresh eggs at the end of July. At Enfield I found a nest on the 17th March, 1894, containing nearly fledged young, and in a tea-tree close by I saw one of these Finches re-lining an old nest, in which young ones had been reared, with fresh green grass blades. Numbers of fledgelings may be seen early in November, and again during the first week in January. The notes of the young ones during flight, as they follow their parents, somewhat resemble the notes of the Short-billed Honey-eater (*Melithreptus brevirostris*.)

When resident at Ripple Creek, Herbert River, Queensland, Mr. J. A. Boyd sent me the following note under date 19th July, 1889:—"We had very cold weather here some few weeks ago, with a frost on the 27th June and another on the 4th July, yet *Egintha temporalis* was breeding, a nest being taken on the 5th instant containing five fresh eggs, and one on the 6th with four nearly fledged young."

In 1899, in "Novitates Zoologicae,"* Dr. Ernst Hartert pointed out the difference in colour and size of some specimens from Cape York, and remarked:—"Comparison of a larger material will probably justify the separation of the Cape York bird as a sub-species."

Judging from a single specimen in the South Australian Museum from Cape York, I regard it as quite distinct from the Red-eyebrowed Finch of the more southern portion of the Continent. It differs chiefly in its slightly smaller size, in having the upper parts golden-olive, the superciliary stripe, rump and upper tail-coverts scarlet, lighter under surface, and more especially in its dull black under tail-coverts.

* Nov. Zool., Vol. VI., p. 427 (1899).

Genus **BATHILDA**, *Reichenbach*.**Bathilda ruficauda.**

RED-TAILED FINCH.

Amadina ruficauda, Gould, Proc. Zool. Soc., 1836, p. 106.

Estrebla ruficauda, Gould, Bds. Austr., fol. Vol. III., pl. 84 (1848).

Bathilda ruficauda, Gould, Handbk. Bds. Austr., Vol. I., p. 412 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 374 (1890).

ADULT MALE—General colour above olive-brown, slightly browner on the wings; the upper tail-coverts with a heart-shaped white spot near the tip, and washed with rosy-crimson; central pair of tail feathers dull crimson, the remainder dusky-brown, indistinctly washed with dull crimson on their outer webs; entire fore half of head, ear-coverts, chin and upper throat crimson, the ear-coverts with tiny rounded white spots; lower throat, fore neck, and sides of the body light olive-grey, each feather having a spot of white near the tip, which are larger on the lower sides of the body; centre of the breast and the abdomen yellowish-white, being paler on the under tail-coverts; bill scarlet; legs and feet yellow; iris orange-red. Total length in the flesh 4·3 inches, wing 2·1, tail 1·8, bill 0·4, tarsus 0·55.

ADULT FEMALE—Like the adult male, but duller in plumage, and having only the forehead, lores, feathers above and below the eye and chin dull crimson.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland.

THE present species, known to bird dealers as the "Star Finch," is freely distributed throughout the coastal and neighbouring districts of North-western Australia, the Northern Territory of South Australia and Queensland. Numerous specimens were procured by the late Mr. T. H. Bowyer-Bower and Mr. E. J. Cairn, in the vicinity of Derby, and near the junction of the Fitzroy and Margaret Rivers, in the early part of 1897, by Mr. G. A. Keartland. M. Octave Le Bon informs me that he trapped numbers of these birds near Wyndham, North-western Australia; also between Cloncurry and Normanton, in the Burke District, Northern Queensland. From the latter State there are specimens in the Australian Museum collection from Dunrobin, Rockhampton and Port Denison, the farthest south I have known this species to occur. Although it appears in Dr. E. P. Ramsay's "Tabular List of Australian Birds" * as occurring in New South Wales and the interior, Dr. Ramsay informs me that he has never seen a specimen from either of these parts of the Australian Continent, and as previously remarked by him, "does not extend further south than Central Queensland." † The small flock of these Finches recorded by me, ‡ seen near Lithgow, on the Blue Mountains, Mr. R. Grant informs me was a case of mistaken identity, they were red-tailed, or rather red-rumped Finches; but it was *Zonaginus bellus*, not *Bathilda ruficauda*. Gould records that he "observed this beautiful finch rather thinly disposed on the sides of the river Namoi," New South Wales, and of another species, *Poephila cincta*, he remarks, "this species is tolerably abundant on the Liverpool Plains." During my visits to these parts I have never observed one species or the other, nor have I seen a specimen of either from the northern or any part of New South Wales, or even the adjoining portions of Southern Queensland. In addition to examining many collections in Northern New South Wales, I have questioned bird-trappers and dealers with a similar

* Tab. List. Austr. Bds., p. 10 (1888.)

† Proc. Linn. Soc. N. S. Wales, Vol. I., 2nd ser., p. 1090 (1886.)

‡ Rec. Austr. Mus., Vol. II., p. 14 (1892.).

result, neither species has been observed or obtained by them in New South Wales. To what then must be ascribed the total absence of these Finches, for it cannot be to the altered state of this part of the country, or the continued want of favourable seasons?

Among a number of adult specimens of *Bathilda ruficauda* now before me, there is a variation principally in the colour of the breast and abdomen and under tail-coverts; some, too, have a more pronounced olive wash on the upper parts. The richest coloured specimen, both on the upper and under surface and also having the largest amount of crimson on the head, is a fine old adult male procured by Mr. E. J. Cairn at Derby, North-western Australia.

Dr. Ernst Hartert has subspecifically separated specimens from Cape York under the name of *Bathilda ruficauda clarescens*, ♀ to which he refers also specimens obtained at the Alligator River, in the Northern Territory of South Australia, † remarking, “the typical larger and darker *ruficauda* is from New South Wales and South Queensland.” Doubtless applicable to this form are the notes of Mr. G. A. Kearland, and the specimens I have referred to from North-western Australia, the Burke District, Gulf of Carpentaria and Queensland. Gould, however, in describing the type, does not give the locality where it was obtained, but only its habitat, New Holland.

Mr. G. A. Kearland sends me the following notes:—“I met with *Bathilda ruficauda* in small flocks near the junction of the Fitzroy and Margaret Rivers, North-western Australia. They frequently came to the horse trough at the well to drink, in company with other species. They were very active morning and evening, but during the heat of the day they sheltered themselves amongst the thickest foliage they could find. Their nests are flask-shaped, and apparently built of fresh gathered grass, as much of the material used in those I examined had not lost its green colour. They were placed in bushes about five feet high. One nest, from which I shot the bird in March, 1897, contained five white eggs.”

Three eggs, taken from one of the above described nests, are oval in form, pure white, the shell being close-grained, smooth and lustreless. They measure:—Length (A) 0.57 × 0.41 inches; (B) 0.57 × 0.43 inches; (C) 0.6 × 0.42 inches. Two eggs received from Dr. Henry Sinclair, in 1891, measure:—Length (A) 0.6 × 0.47 inches; (B) 0.6 × 0.45 inches.

From notes made by Mr. F. Lawson Whitlock, while collecting in the neighbourhood of the De Grey and Coongan Rivers, in North-western Australia, on behalf of Mr. H. L. White, of Belltrees, Scone, New South Wales, I have extracted the following information:—“*Bathilda ruficauda* is found both on the Upper Coongan and also the De Grey Rivers, but is local in the extreme. I disturbed a sitting female from her nest in a small bush in the bed of the Coongan River, whilst watching a pair of *Egialitis melanops*. I was much puzzled at first, as I could see at once that the nest was not that of *Teniopygia castanotis*. It was very round, rather large, and woven in quite a different manner, and moreover had a scanty lining of feathers. I hid myself and watched, and after a time saw the female slip into the nest, and eventually I secured the pair of birds. On the De Grey River I caught a couple of nestlings for examination, and found the old nest near at hand, and in the same prickly climbing plant was a new nest containing eggs. The call note of this species is very feeble, and resembles somewhat that of *Zosterops gouldi*.”

Young birds have the head and upper parts ochreous brown; upper tail-coverts and central tail feathers dull red; all the under surface and under tail-coverts ochreous, paler on the abdomen; bill black; legs and feet light brown; iris brown. Wing 1.9 inches.

* Nov. Zool., Vol. VI., p. 427 (1899.)

† Nov. Zool., Vol. XII., p. 238 (1905.)

Genus **POEPHILA**, *Gould*.**Poephila acuticauda.**

LONG-TAILED GRASS FINCH.

Ammodina acuticauda, Gould, Proc. Zool. Soc., 1839, p. 143.*Poephila acuticauda*, Gould, Bds. Austr., fol. Vol. III., pl. 90 (1848); *id.*, Hand-bk. Bds. Austr., Vol. I., p. 422 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 375 (1890); North, Proc. Linn. Soc. N. S. Wales, Vol. II., 2nd series, p. 408 (1888).

ADULT MALE—*Crown of the head and nape grey; mantle pinkish-brown; wings and back brown. Upper tail-coverts white; a bar across the rump, and the tail feathers black; lores black; cheeks light grey; chin and throat black; remainder of the under surface pinkish fawn colour; each side of the lower flanks crossed with a black band; vent and under tail-coverts white; bill wax yellow; legs and feet bright red; iris black. Total length in the flesh 6·5 inches, wing 2·45, central tail feathers 3·5, bill 0·5, tarsus 0·55.*

ADULT FEMALE—*Similar in plumage to the male.**Distribution*—North-western Australia.

THE Long-tailed Grass Finch, which may be distinguished by its pale wax yellow bill, is exclusively confined to the north-western portions of the continent; those specimens referred to by various writers from the Northern Territory of South Australia, belong to its close ally *Poephila heeki*. The late Mr. T. H. Bowyer-Bower collected a fine series of skins of *Poephila acuticauda*, near Derby, North-western Australia, in 1886; and his assistant, Mr. W. Burton, brought a number of live birds to Sydney. This species lives well in confinement, and Dr. E. P. Ramsay had several pairs breeding in an aviary at the Australian Museum. While a member of the Calvert Exploring Expedition, Mr. G. A. Keartland obtained specimens near the Fitzroy River, in North-western Australia, in 1896-7. Live birds were also trapped by placing a dish of water under a frame covered with cheese-cloth. Some of these birds I saw in an aviary at Mr. Keartland's home near Melbourne.

The total length of the two attenuated central tail feathers varies considerably; in perfectly plumaged specimens they average three inches and a half. Gould refers to a specimen in the British Museum, having the central tail feathers five inches and a quarter in length, which is evidently abnormal, as the total length of an average bird in the flesh is only 6·5 inches. Gould figures and describes the feet of this species as yellow, the colour probably being taken from a dried skin; in living birds they are bright red.

The late Mr. T. H. Bowyer-Bower found this species breeding near Derby, in the long grass and low bushes, forming a dome-shaped nest of grasses, and laying usually five eggs for a sitting. In the same locality nests were found by Mr. E. J. Cairn during September and October. The birds Dr. E. P. Ramsay had in an aviary at the Museum, had no fixed breeding times, young birds being reared at all seasons of the year.

The eggs are white, and vary from oval to elongate oval in form, the shell being close-grained, smooth and lustreless. A set of five measures:—Length (A) 0·68 × 0·48 inches; (B) 0·65 × 0·4 inches; (C) 0·69 × 0·46 inches; (D) 0·71 × 0·48 inches; (F) 0·65 × 0·43 inches. Another set of five in Mr. G. A. Keartland's collection, taken by Mr. George Douglas on the 8th May, 1900, near the Fitzroy River, measures:—Length (A) 0·62 × 0·43 inches; (B) 0·63 × 0·43 inches; (C) 0·61 × 0·46 inches; (D) 0·62 × 0·44 inches; (E) 0·63 × 0·46 inches.

Young birds resemble the adults, but are everywhere much duller in colour; tail feathers brownish-black, all but the central pair tipped with white, more largely on the outermost feather on either side.

Poephila hecki.

ORANGE-BILLED GRASS FINCH.

Poephila hecki, Heinroth, Ornith. Monatsb., Jahrg. VIII., p. 22 (1900); North, Proc. Linn. Soc. N. S. Wales, Vol. XXX., p. 101 (1905).

Poephila aurantiirostris, North, Proc. Linn. Soc. N. S. Wales, Vol. XXVII., p. 207 (1902).

ADULT MALE—*Similar to the adult male of POEPHILA ACUTICAUDA, Gould, but having the bill orange-scarlet instead of pale wax yellow, as in that species. Total length in the flesh, 5.5 inches, wing 2.35, central tail feathers 2.5, bill 0.45, tarsus 0.6.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia.

THE Orange-billed Grass Finch was originally described by Dr. O. Heinroth from living examples in the Berlin Zoological Gardens, under the name of *Poephila hecki*, but the part of Australia from which the birds were procured was not known to the describer.

Unaware at the time of this description, I first brought under notice in Australia the present species, while making the following remarks in the "Proceedings of the Linnean Society of New South Wales" * in 1902:—"Among a large number of live birds brought to Sydney a few years ago by M. Octave Le Bon, who had trapped them in North-western Australia, my attention was arrested by numerous examples of Long-tailed Grass Finches. The greater number captured at Derby were of the well known type of *Poephila acuticauda*, with pale wax yellow bills, while those caught at Wyndham were almost similar in colour, but were distinguished by having their bills orange-scarlet, forming a marked contrast, especially when seen together in the same cage. This distinction was also pointed out to me some time ago by Mr. G. A. Keartland, of Melbourne, who had both the pale yellow and orange-billed birds in confinement; and again more recently by sending me a skin of one of the latter that had died the previous day in his aviary. Mr. Keartland, who had many opportunities of observing *Poephila acuticauda* while at Derby, informs me that the bills of all the specimens he collected, and of sixteen birds he brought back with him alive, were all pale wax-yellow. Since his return others caught at Wyndham and Port Darwin, and which he had in confinement, were all distinguished by their orange-scarlet bills. Age or sex has nothing to do with this distinction, for I have seen many hundreds of *Poephila acuticauda*, and have had them under observation from the nestling to the adult, while breeding in confinement. If the colour of the bills of the Wyndham and Port Darwin birds is not a specific character, it certainly constitutes a very distinct variety of *Poephila acuticauda*, which I propose to distinguish under the name of *Poephila aurantiirostris*." Since that time I have seen large numbers of these birds that were caught inland from Port Darwin, in the Northern Territory of South Australia, and Mr. Percy Peir has presented specimens to the Trustees of the Australian Museum obtained in the same district. The colour of the bill of both *Poephila acuticauda* and *Poephila hecki* quickly fades after death, and when skins are kept for a year or two, it is impossible to distinguish one from the other, unless they are properly labelled when the skins are first prepared.

Of the nidification of *Poephila hecki* I know nothing, but doubtless it is similar to that of its close ally *Poephila acuticauda*. A set of eggs of the former in Mr. G. A. Keartland's collection, taken at Wyndham, North-western Australia, on the 14th June, 1902, are pure white, oval in form, the shell being close-grained, smooth and lustreless, and measure as follows:—Length (A) 0.62 × 0.46 inches; (B) 0.62 × 0.48 inches; (C) 0.62 × 0.46 inches; (D) 0.63 × 0.47 inches. (E) 0.62 × 0.45 inches.

* Proc. Linn. Soc. N. S. Wales, Vol. XXVII., p. 207 (1902).

Poephila cincta.

BANDED GRASS FINCH.

Amadina cincta, Gould, Proc. Zool. Soc., 1836, p. 105.

Poephila cincta, Gould, Bds. Aust., fol. Vol. III., pl. 93 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 425 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 376 (1890).

ADULT MALE—*Crown of the head and nape grey; hind neck and upper portion of the back cinnamon-brown; lower back brown; the rump crossed with a black bar; upper tail-coverts white; tail feathers black; wings brown; forehead, ear-coverts and cheeks whitish-grey; lores and throat black; remainder of the under surface cinnamon, the lower flanks crossed with a black bar; vent and under tail-coverts white; bill black; legs and feet red; iris black. Total length in the flesh 4.6 inches, wing 2.4, tail 1.6, bill 0.4, tarsus 0.6.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Queensland.

EXCEPT in the extreme north the well-known Banded Grass Finch, or "Black-throat" of bird dealers, is freely distributed in the eastern portions of Queensland. Gould remarks that "this species is tolerably abundant on the Liverpool Plains, and the open country to the northward towards the interior. It occurs so rarely on the sea side of the ranges, that I only once met with it during my sojourn in New South Wales." As I have pointed out elsewhere, I have never seen this species in any part of this State, or observed a specimen of it in any of the numerous collections I have examined, or heard of any one finding it in a state of nature in New South Wales.

It lives and breeds well in confinement, many young birds being reared in an aviary previously kept by Dr. E. P. Ramsay at the Australian Museum.

The seeds of various grasses constitute the usual food of this species, but M. Octave Le Bon informed me that numbers of birds he had trapped in Queensland were feeding on minute insects found in grass lands.

While resident at Ripple Creek, Herbert River, Queensland, Mr. J. A. Boyd sent me the following notes:—"On the 25th March, 1891, I found a nest of *Poephila cincta* containing five unfledged young, and on the 14th April, 1891, I found another nest that seemed nearly finished, and on visiting it a week later found it contained three eggs. On the 23rd November, 1893, I found a nest of this species with six eggs, one more than the usual number. These birds are still breeding; I got a nest on the 13th November, 1894, with seven eggs, but all too incubated to blow. On the 9th of the same month I found a new nest with one egg, built in the sugar-cane leaves, the first I have noticed in such a position. The birds are breeding here very late. I saw a nest with fresh eggs of *Poephila cincta* on the 9th April, 1896. I found a nest on the 5th March, 1897; the parent flew out, but I did not rob her. Last year was marked by a most unusual absence of our two common Finches; one might ride all day without seeing a specimen."

Mr. H. G. Barnard, Duaringa, Queensland, writes me:—" *Poephila cincta* breeds at any time when there is plenty of grass seed; number of eggs in sets, from five to seven; I have taken seven in three sets, but five and six are the usual sets. The breeding places of this Finch vary considerably, being placed in saplings from five feet from the ground to forty feet; this little bird is very fond of breeding in the sticks under Hawks' nests. I have found the nests built on the under side of nests of the following species:—*Uroaetus auidax*, *Nisaeetus morfhnoides*, *Haliastur sphenurus*, *Lophoictinia isura*, *Astur approximans* and *Accipiter cirrhocephalus*. A nest of *Nisaeetus morfhnoides* visited in September, 1906, contained one egg, with the young bird half out of the

shell, while on the underside was a nest of *P. cincta*, which contained three newly hatched young and two eggs just hatching, while within a few feet of the Eagle's nest were no less than three other nests of *P. cincta*, all of which contained young. These birds also frequently build their nests in the hollow spouts of dead limbs."

Writing on the 17th July, 1907, Mr. Barnard remarks:—" *Poephila cincta* is building now; there are also nests here with eggs and young. On the 8th December, 1893, I saw a nest of this species containing young, at Duaringa Railway Station, built under the arm of the semaphore."

A nest of this species taken by Mr. H. G. Barnard, at Duaringa, Queensland, is a rounded oval structure with a somewhat large entrance near the top; it is compactly formed at the base with coarse grass stems and thin flowering plant stalks, the walls becoming thinner towards the top, and the spout-like entrance consists entirely of very fine dried grasses. Externally it measures nine inches and a half in length, by four inches and a half in breadth, and across the entrance two inches. It is built near the junction of several many thin branched upright forks of a small-leaved shrub, and was seven feet from the ground.

The eggs are usually five, sometimes six, and rarely seven in number for a sitting, pure white, oval or elongated oval in form, the shell being close-grained, smooth and lustreless. A set of five measures:—Length (A) 0·65 × 0·5 inches; (B) 0·66 × 0·49 inches; (C) 0·65 × 0·51 inches; (D) 0·65 × 0·52 inches; (E) 0·66 × 0·5 inches. A set of six measures: Length (A) 0·7 × 0·49 inches; (B) 0·72 × 0·5 inches; (C) 0·72 × 0·51 inches; (D) 0·7 × 0·52 inches; (E) 0·72 × 0·49 inches; (F) 0·73 × 0·51 inches.

Fully fledged birds resemble the adults in plumage, but are very much paler, and the throat is brown, not black. Wing 1·9 inches.

From the preceding notes it will be seen that there is no fixed breeding season for the Black-throated Finch, but nests with eggs or young are more frequently found during the first three and the last three months of the year.

POEPHILA GOULDIÆ.

GOULDIAN GRASS FINCH.

Amadina gouldiæ, Gould, Proc. Zool. Soc., 1844, p. 5; *id.*, Gould, Bds. Austr., fol. Vol. III., pl. 88 (1848).

Poephila mirabilis, Des Murs., Iconogr. Orn., pl. III. (1845); Gould, Bds. Austr., fol. Vol. III., pl. 89 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 421 (1865).

Poephila gouldiæ, Gould, Handbk. Bds. Austr., Vol. I., p. 420 (1865).

Poephila armitiana, Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. II., p. 70 (1878).

POEPHILA MIRABILIS.

ADULT MALE ("Red"-headed var.):—*General colour above grass-green; upper wing-coverts and secondaries like the back; primaries brown, edged externally with dull grass-green; rump and upper tail-coverts blue; tail feathers black; lores, cheeks and ear-coverts, forehead and snicuput scarlet, bordered by a narrow line of black, widening out into a conspicuous black patch on the upper throat, and followed by a band of bright cobalt-blue, which is broader on the occiput; fore neck and chest lilac; remainder of the under surface golden-yellow; under tail-coverts white; bill whitish, red at the tip; legs and feet dull ochreous-yellow; iris black. Total length in the flesh 5·3 inches, wing 2·68, central tail feathers 2·3, bill 0·47, tarsus 0·55.*

POEPHILA GOULDIE.

ADULT MALE (Black-headed var.) :—Similar to the preceding, but without any scarlet on the head, the lores, cheeks, ear-coverts, forehead and supercilium being entirely black like the throat.

POEPHILA ARMITIANA.

ADULT MALE ("Yellow"-headed var.) :—Similar to the "red"-headed variety, but having those parts of the head ochreous-yellow instead of scarlet.

ADULT FEMALE—Typically the adult females of the red-headed and black-headed birds are only to be distinguished from the adult males by their duller plumage, especially of the lilac fore neck and chest, and the blue on the occiput; there appears, however, to be a preponderance of black-headed females, and occasionally very old females of both forms are as brilliant in colour as the adult males.

Distribution—North-western Australia, Northern Territory of South Australia, Northern Queensland.



GOULDIAN GRASS FINCH.

As pointed out by me at a meeting of the Linnean Society of New South Wales, in March, 1889, all the above described forms may be referred to a single species, *Poephila mirabilis*. Dr. E. Hartert has, however, more recently shown in "Novitates Zoologicae" * that Des Murs name must give way to Gould's older name of *Poephila gouldie*, published in 1844, the preceding year. Its range extends right across the northern portion of the Australian Continent, from the neighbourhood of Charters Towers, in Queensland, to Derby in North-western Australia, grassy plains in the vicinity of water being its favourite haunts. Where they occur in any number every collector has observed black-headed and red-headed birds together. M. Octave Le Bon informs me that at Croydon, in Queensland, and near Wyndham in North-western Australia, he has never made a pull of the trap without securing both forms. They are easily caught, over one hundred birds being obtained at one time. Unlike many other species of Australian Finches, they do not sulk, young birds even starting to feed before they are taken out of the nets.

Probably more has been written about the breeding of this species in confinement than any other member of the Australian *Ploceidae*, on account of the varying phases of its plumage, and more especially the assumption of the scarlet feathers on the head of the form known as *Poephila mirabilis*. In a large series of skins now before me, there is a specimen with a few bright scarlet feathers among the dusky-grey feathers on the head, first assumed in youth; in others the scarlet feathers are seen among the dull black feathers of the head of a later stage of plumage; while another shows traces of dull scarlet feathers among the rich velvety black plumage of the head of what otherwise might be regarded as a very old female of *Poephila gouldie*. When the young first leave the nest, the plumage of both forms is alike. Of three young ones bred in Dr. E. P. Ramsay's aviary, at the Museum, in May 1888, from a black-headed pair of birds, all first assumed the dull black head of the young stage, but later on one developed the scarlet head of the form known as *Poephila mirabilis*. That one may expect to get the same coloured young as the parents from either a red-headed pair or a black-headed pair of birds, is only reasonable, but there appears to be no certainty about it, as in a state of nature both forms are caught together,

* Nov. Zool., Vol. XI., p. 238 (1905).

and are frequently kept together until they come into the breeder's possession. Absolute proof of the uncertainty of what the adult stage of one of these Finches may be, is afforded by a specimen in the Australian Museum collection, presented by Mr. Percy Pier. It was purchased by him with some others, caught near Port Darwin, in the modest garb of the usual livery of the first plumage of both forms of this species, but instead of assuming in its adult stage either a scarlet or a black head, it has the ochreous-yellow lores, sides of face, forehead and sinciput of the rare form described by Dr. Ramsay under the name of *Poephila armitiana*. It is a fine old male, is in perfect plumage, and lived eighteen months in captivity. This subject, so full of interest to aviculturists, has been dealt with in the pages of the "Avicultural Magazine," and more especially in an interesting article by Dr. A. G. Butler on the "Mutation of the Gouldian Finch."

The nest is a dome-shaped structure composed entirely of dried grasses, and is usually placed in a low bush or tree not far from the ground.

The eggs are usually five in number for a sitting, pure white, and vary from oval to nearly pyriform in shape, the shell being close-grained, smooth and lustreless. A set of five measures as follows:—Length (A) 0.66 × 0.5 inches; (B) 0.68 × 0.49 inches; (C) 0.69 × 0.48 inches; (D) 0.68 × 0.47 inches; (E) 0.67 × 0.5 inches.

In North-western Australia it usually breeds during November and December, and in the Northern Territory of South Australia and North Queensland, after the first rain, usually at the end of January or early in February and March. In confinement they breed at any time, and frequently in the coldest months of the year.

Poephila personata.

MASKED GRASS FINCH.

Poephila personata, Gould, Proc. Zool. Soc., 1842, p. 18; *id.*, Bds. Austr., fol. Vol. III., pl. 91 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 423 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 377 (1890).

ADULT MALE—*General colour above light cinnamon-brown, upper wing-coverts like the back, the lower back and apical half of the quills of a darker and pronounced greyish shade; rump and upper tail-coverts white; tail feathers black; forehead, lores, anterior portion of cheeks and a large triangular-shaped spot on the chin and upper throat, black; sides of head and under surface of the body, pinkish-brown; on the lower flanks a large black patch; centre of lower abdomen, thighs and under tail-coverts white; bill deep yellow; legs and feet coral-red; iris black. Total length in the flesh 5.2 inches, wing 2.4, central tail feathers 2.4, bill 0.42, tarsus 0.55.*

ADULT FEMALE—*Similar in plumage to the male, but slightly smaller.*

Distribution—North-western Australia, Northern Territory of South Australia.

THE Masked Grass Finch is an inhabitant of the Northern Territory of South Australia and North-western Australia. All the specimens in the Australian Museum collection were procured in the Northern Territory of South Australia. The late Mr. Alexander Morton obtained this species at Yam Creek, and Dr. Henry Sinclair, M. Octave Le Bon, Mr. W. J. Banks and Mr. Robert Grant presented specimens that had all been obtained in the neighbourhood of Port Darwin. A specimen was also received from the late Mr. J. D. Young, who netted it among a number of others, in the same district. It is a common species in the Sydney bird-dealers' shops, and from inquiries made, nearly all were procured either inland or near Port Darwin. Dr. R. B. Sharpe, in the "Catalogue of Birds in the British Museum," † enumerates specimens from the Northern Territory of South Australia and North-western Australia, and so also does Dr. Ernst Hartert in "Novitates Zoologicæ." ‡

† Vol. IV., p. 326 (1906). ‡ Cat. Bds. Brit. Mus., Vol. XIII., p. 377 (1890). § Nov. Zool., Vol. XII., p. 238 (1905).

There is but little variation in a number of specimens now before me, but all are paler in colour, especially on the under parts, than is represented in Gould's folio edition of the "Birds of Australia." *

Mr. G. A. Keartland sent me on loan, for examination, a set of eggs taken by Mr. E. J. Harris from an oval grass-formed nest built in a low bush in February, 1899, near the Fitzroy River in North-western Australia, accompanied by a skin of the female. The eggs, four in number, are oval in form, the shell being white, close-grained and its surface smooth and lustreless, and measure:—Length (A) 0·63 × 0·52 inches; (B) 0·7 × 0·47 inches; (C) 0·62 × 0·47 inches; (D) 0·65 × 0·53 inches.

Poephila leucotis.

WHITE-EARED GRASS FINCH.

Poephila leucotis, Gould, Proc. Zool. Soc., 1846, p. 106; *id.*, Bds. Austr., fol. Vol. III., pl. 92 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 424 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 377 (1890).

ADULT MALE—*General colour above, including the wings, cinnamon colour, being slightly darker on the sinciput and crown of the head; rump and upper tail-coverts white; tail feathers black; lores, forehead, anterior portion of cheeks, and a large oval spot on the chin and upper throat, black; ear-coverts, posterior portion of cheek and a narrow band below the upper throat white; breast very pale vinous-brown, which is separated from a large black patch on either flank by a narrow white band; centre of lower breast and abdomen, thighs and under tail-coverts, white. Total length in the flesh 4·8 inches, wing 2·25, tail 2, bill 0·4, tarsus 0·55.*

ADULT FEMALE—*Similar in plumage to the male, but slightly smaller.*

Distribution—Northern Queensland.

GOULD described this very distinct species in the "Proceedings of the Zoological Society" of London, in 1846. † The type was obtained by Gilbert, near the Lynd River, on the 3rd June, 1845, during Dr. Leichhardt's "Overland Expedition from Moreton Bay to Port Essington," and just twenty-five days before he was treacherously speared and killed by the blacks. It is beautifully figured by Gould, in his folio edition of the "Birds of Australia," and shows the gradual blending of the very pale vinous-brown breast into the white of the ear-coverts, upper throat and lower breast. Specimens in the Australian Museum collection were obtained by Mr. T. H. Gulliver at Normanton, near the mouth of the Norman River, by Captain E. Armit at Georgetown, and there is a very fine adult male, presented by Dr. Henry Sinclair, of Sydney. At various times I have noted this species in the bird dealers' shops of Sydney, but in far smaller numbers than the preceding species, *Poephila personata*. From inquiries made, they were all obtained in the Gulf District of Queensland, and although I have never seen specimens from any other State, its range probably extends into the eastern portions of the Northern Territory of South Australia.

Dr. Henry Sinclair, of Sydney, had a pair of these Finches construct a nest in confinement, which was of the usual flask-shaped form, and composed wholly of dried grasses. Four eggs were laid, on which the female sat for some time, but did not succeed in hatching them.

A set of four eggs taken at Georgetown, in the Burke District, Northern Queensland, and not far distant from the Gulf of Carpentaria, are oval in form, somewhat pointed at the smaller end, pure white, the shell being close-grained, smooth and lustreless, and measure as follows:—Length (A) 0·63 × 0·45 inches; (B) 0·63 × 0·48 inches; (C) 0·65 × 0·47 inches; (D) 0·62 × 0·47 inches.

* Gould, Bds. Austr., fol. Vol. III., p. 91 (1848). † Proc. Zool. Soc., 1846, p. 10

Poephila nigrotecta.

BLACK-RUMPED GRASS FINCH.

Poephila nigrotecta, Hartert, Bull. Brit. Orn. Club (Ibis, 1899, p. 647).

Poephila atropygialis (*vox hybrida*, Diggles), Castl. and Ramsay, Proc. Linn. Soc. N. S. Wales, Vol. I., p. 382 (1877); North, Rec. Austr. Mus., Vol. V, p. 263 (1904).

ADULT MALE—*Resembles the adult male of POEPHILA CINCTA, Gould, but is lighter in colour, and has the upper tail-coverts black. Total length (of skin), 4.2 inches, wing 2.35, tail 1.6, bill 0.4, tarsus 0.6.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Northern Queensland.

THE Black-rumped Grass Finch was described as a new species by the late Comte de Castlenau and Dr. E. P. Ramsay, in the "Proceedings of the Linnean Society of New South Wales" in 1877, and in a footnote to their description of *Poephila atropygialis*, made the following remarks:—"Diggles, *Queenslander* newspaper, 1876. We have adopted the name proposed by Mr. Diggles, of Queensland, for this new species, but more out of compliment to that gentleman than in accordance with the strict rules of nomenclature, as it will be evident to all ornithologists that the merely proposing a name and pointing out a difference in a newspaper can scarcely be looked upon as describing the species. We trust our friend will take this hint in the kindly spirit it is meant, and when he again favours us with the announcement of any species, we hope they will be fully described." There are three specimens in the Reference Collection, and they were obtained at the mouth of the Norman River, Gulf of Carpentaria. Dr. E. Hartert has also described specimens from Cape York, under the name of *Poephila nigrotecta*.

Of its nidification Dr. Ramsay remarks:—"This fine species is distributed over the country between the Gulf of Carpentaria and Georgetown and its neighbourhood, where it is said to be common along with *Donacicola pectoralis*, *Poephila leucotis* and *Poephila personata*. Its nest is an oval structure of interwoven grasses, having an opening at one end partly concealed by long grasses drawn over the entrance. It is placed among the stronger grasses, or small bushes which grow here and there on the grass flats, or among the leaves of the *Pandanus aquaticus*."

The eggs are five or six in number for a sitting, pure white, oval in form, the shell being close-grained, smooth and lustreless. A set of five taken at Normanton measures:—Length (A) 0.63 × 0.45 inches; (B) 0.65 × 0.46 inches; (C) 0.65 × 0.47 inches; (D) 0.62 × 0.45 inches; (E) 0.65 × 0.45 inches.

Genus NEOCHMIA, *Bonaparte*.

Neochmia phaeton.

CRIMSON FINCH.

Fringilla phaeton, Hombr. et Jacq., Ann. Sci. Nat., Tom. XVI., p. 314 (1841).

Estrela phaeton, Gould, Bds. Austr., fol. Vol. III., pl. 83 (1848).

Neochmia phaeton, Gould, Handb. Bds. Austr., Vol. I., p. 415 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 389 (1890).

ADULT MALE—*General colour above brown, the exposed portion of the feathers on the back dull crimson; upper tail-coverts bright crimson; upper wing-coverts and innermost secondaries like the back, the outer secondaries brown, margined externally with dull crimson; primaries brown, their outer edges yellowish-brown; central pair of tail feathers dull crimson, the remainder having the outer webs dull*

crimson and their inner webs brown; centre of forehead and crown of the head and neck dark ashy-brown, with a purplish-black lustre on the forehead and crown of the head; lores, a line of feathers over the eye, sides of face, ear-coverts and under surface of the body rich crimson-red, some of the feathers on the sides of the breast with small rounded white spots; centre of lower breast, abdomen and under tail-coverts black; bill red, lighter at the base; legs and feet dingy fleshy-yellow. Total length 5 inches, wing 2, central tail-feathers 2.5, bill 0.4, tarsus 0.55.

ADULT FEMALE—Differs from the adult male in having the centre of forehead and crown of the head ashy-brown like the back, the latter having only a few feathers tipped with dull crimson; the crimson of the lores, sides of face and throat is duller in colour, and the fore neck and breast ashy-brown, the latter similarly spotted with white at the sides; the centre of the lower breast and abdomen light fulvous-brown, becoming slightly darker on the under tail-coverts.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland.

M. M. Hombron and Jacquinot described the type of this species in 1841 from a specimen collected at Raffles Bay, in the Northern Territory of South Australia. In February, 1879, the late Mr. Alexander Morton, collecting on behalf of the Trustees of the Australian Museum, obtained a fine series of specimens at Port Essington. Mr. E. J. Cairn and the late Mr. T. H. Bowyer-Bower, procured a number of examples in 1886 in the vicinity of Derby, North-western Australia, Mr. G. A. Keartland obtained specimens near the junction of the Fitzroy and Margaret Rivers, and M. Octave Le Bon trapped many live birds at Goose Lagoon, in the neighbourhood of Wyndham. It is a common species in the coastal districts of Eastern Queensland; Mr. K. Broadbent obtained specimens at Cardwell, Mr. J. A. Boyd found it breeding freely in the Herbert River District, and Mr. George Masters procured specimens at Port Denison in September, 1864.

A geographical variation is apparent in adult males obtained at Cardwell and Port Denison in Queensland, and the vicinity of Derby, North-western Australia. They may be readily distinguished by having the upper portion of the head a uniform brown, and lacking the purplish black lustre on the forehead and crown of the head of typical examples procured at Port Essington. In their original description M. M. Hombron and Jacquinot describe the head as dark blue.

The following interesting information, relative to the nesting habits of the Crimson Finch, or "Blood Finch" as it is called by bird dealers, has been extracted from letters received by me at various times from Mr. J. A. Boyd, while resident at Ripple Creek, Herbert River, Queensland, to whom I am also indebted for the nest and many sets of eggs of this species:—"After several attempts, resulting either in young birds or empty nests, I obtained on the 9th December, 1889, a nest of *Neochmia phaeon*, containing eight eggs, all more or less incubated. On the 31st December I took a nest which I had been watching for some time. It was built in the thatch of the calf pen, and I had seen the birds carrying in quantities of fowl feathers, but for some reason or other they had deserted it without laying. I found a nest on the 15th November, 1891. It was built among the butts of the fallen leaves of a *Pandanus* tree, and was formed of "Blady-grass," and thickly lined with breast feathers of *Anas superciliosa*. The nest was just about finished, and a week later I took from it five fresh eggs. On the same day I saw a cock bird emerge from another nest; it was empty, and when I returned a week later to take it a rat bolted through the side and got away in the grass; needless to say there were no eggs. These birds frequently build nests and never lay in them, no less than five nests I found recently turning out blanks. Last year one pair made three nests and only laid one egg, and now the same pair of birds have just left their first nest. To-day one of the boys came in triumph with a nest and the female in his hand, and then found that the four eggs had fallen through the bottom of the nest and were lost. One pair has built in the verandah of the school house,

another pair have a nest in one of the forks supporting the grass roof of a shed, used as a stable. The former deserted their nest, but from the nest in the stable-shed I took seven fresh eggs on the 11th December, 1892. Another nest, containing four fresh eggs, was brought me on the same day taken from a *Pandanus*. These Finches seem ubiquitous in their choice of breeding places. I noticed one hop out at the base of a Cocconut leaf, and found a new nest there. I watched a male bird with grass in his bill fly to the top of a small Leichhardt Tree, and there saw a bulky nest built away among twigs springing from an horizontal limb. Last year, owing to the mild winter, these Finches did not congregate about the stables to pick up the fallen seed as usual. On the 25th August, 1893, I found one of their nests with young just ready to fly, and took a nest in a Leichhardt Tree at Goose Lagoon, in October 1893, containing five fresh eggs. It was a bulky structure and thickly lined with feathers of the Magpie Goose (*Auseranus melanoleuca*). On the 1st February, 1894, I saw a Crimson Finch fly from its nest in a small tea-tree; these birds have been breeding now for eight months. On the 10th February I noticed one building in a Cocconut Palm, and five days later found one in an Alligator Pear-tree containing five incubated eggs. I thought the breeding season had finished, but on the 22nd March, 1894, a Finch almost flew in my face, and I found a nest of *Neochmia phaeton*, containing three fresh eggs, built between the butt of a palm frond and the stem. On the 14th March, 1895, I found a nest with five eggs. *Neochmia phaeton*, like the acclimatised Sparrow, seems to breed anywhere, trees, palms, *Pandanus* and houses seem alike to them."

Mr. G. A. Keartland writes me as follows:—"I saw many nests of *Neochmia phaeton* near the junction of the Fitzroy and Margaret Rivers, North-western Australia. They were all made of very coarse grass strippings, some of which were so large that the birds could scarcely carry them, but the interior was lined with softer material. At all the habitations along the Fitzroy River, these birds make their appearance just before the heavy rains of January, and commence building at once, but as soon as the young broods are reared they all clear out again. The Crimson Finch seems to delight in the company of man, and although I found over thirty nests, they were all attached to dwelling houses, under the eaves or on the rafters of the verandahs. At the Police Camp eleven nests could be seen, two of them being within twelve inches of each other. At Mr. Blyth's Camp several nests were under the eaves of the bough shade, and the birds hopped about the floor within three or four feet of those sitting at the breakfast table. Although some birds were taken from the nests and handled, they soon returned to their eggs when liberated. At Mr. E. J. Harris's store room many nests were seen on the wall plates, and in one instance a pair of birds entered at one of the corrugations of the roofing iron, flew across the room, and built their nest in a coil of telegraph wire hanging on the wall. I never saw a nest of this species in a bush or tree."

Five or six eggs are usually laid for a sitting, sometimes seven, and occasionally eight. They are pure white, oval or elongate-oval in form, some specimens being slightly pointed at the smaller end, the shell being close-grained, smooth and lustreless. Seven eggs of a set of eight taken by Mr. J. A. Boyd, on the 9th December, 1889, measure as follows:—Length (A) 0·65 × 0·45 inches; (B) 0·65 × 0·45 inches; (C) 0·65 × 0·46 inches; (D) 0·7 × 0·43 inches; (E) 0·68 × 0·45 inches; (F) 0·65 × 0·47 inches; (G) 0·64 × 0·55 inches.

Semi-adult males are ochreous-brown above and below, slightly washed with dull crimson on the upper wing-coverts, innermost secondaries and tail feathers; some of the feathers on the breast crimson, a few on the lower breast and vent dull black, centre of the breast and abdomen dull ochreous white. Wing 1·9 inches.

August until the end of March appears to constitute the usual breeding season, but doubtless, like that of many other species, it is greatly influenced by the rainfall, so nests may be found in every month of the year.

Family MOTACILLIDÆ.

Genus ANTHUS, Bechstein.

Anthus australis.

AUSTRALIAN PIPIT.

Anthus australis, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 229 (1826); Gould, Bds. Austr., fol. Vol. III., pl. 73 (1848); *id.*, Hand-bk. Bds. Austr., Vol. I., p. 392 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. X., p. 615 (1885).

ADULT MALE—*General colour above, including the head and sides of the neck dark brown, all the feathers having pale fawn-buff margins; upper wing-coverts and secondaries dark brown, with rich buff margins; the primaries dark brown, externally edged with white; tail feathers blackish-brown, the central pair with brownish-white margins, the two outermost on either side white, with blackish-brown shafts, and broadly margined on their inner webs, except near the tip with dark-brown; a distinct eye-brow buffy-white; feathers below the eye dull white mottled with brown; ear-coverts, brown; cheeks and throat separated by a blackish-brown malar stripe; remainder of the under surface dull white, the feathers on the fore neck, chest and sides of the body washed with buffy-brown and centrally streaked with blackish-brown, these markings being broader and more distinct on the fore neck and chest; under tail-coverts dull white, slightly tinged with buff; bill brown, the lower mandible, except at the tip, fleshy-brown; legs yellowish-brown, the feet slightly darker; iris dark brown. Total length in the flesh 7 inches, wing 3.5, tail 2.7, bill 0.5, tarsus 0.95.*

ADULT FEMALE—*The sexes are alike in plumage.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, Tasmania.

THE Australian Pipit, better known as the "Ground Lark," appears to be almost universally distributed over the island continent; it is likewise found in Tasmania. It chiefly frequents grass lands, open plains and cultivation paddocks, and is common everywhere, particularly at the end of summer, after the breeding season is over, when it may be met with in small scattered flocks. Usually one's attention is attracted to it as it passes rapidly over the grassy sward, taking flight for a short distance when too closely approached, and then alighting again, sometimes on the top of a stump or post, but far more often on the ground. On rare occasions I have also seen it perch high up on the lateral dead branches of a gum tree. In Albert Park and Moonee Ponds, near Melbourne, I have often witnessed the upward soaring of this species during the bright and clear days of spring. It rises in a series of short undulating flights, as if mounting an aerial stairway, uttering each time as it ascends a somewhat mournful note resembling that of *Lamprococcyx basalix*, pausing and dropping a few feet before it again starts its upward flight. This is repeated until the bird is at an altitude of between two and three hundred feet, when it takes a downward flight for a short distance before descending, like a shooting star in one bold and almost straight flight rapidly to within a few feet of the earth, above which it flies for about fifty yards before finally alighting on the ground again.

Stomachs of these birds I have examined contained the remains of insects; those procured in July had also a few small seeds.

While resident at Point Cloates, North-western Australia, Mr. Tom Carter wrote me as follows:—" *Anthus australis* is to be met with everywhere throughout the year in this district, and even during prolonged droughts, when other species were almost totally absent."

From Broken Hill, in South-western New South Wales, Dr. W. Macgillivray writes me:—" *Anthus australis* is often the only bird one sees on the dry sandy plains about here, with occasionally a troop of Australian Dottrels; after rain other birds appear, but *Anthus* is here

always, and everywhere quite common in the town on any bare allotment. This summer being a very dry one, only half an inch of rain having fallen since August, these birds have come into the town in numbers; especially numerous are they in the central reserve, where the Council has been tipping a great quantity of manure."

While resident at Circular Head, Tasmania, Dr. L. Holden sent me the following notes:—"On the 14th November, 1886, I found three nests of *Anthus australis*, on a sand-bank near the beach. All were built of dry grass lined with hair, level with the ground, and protected by overhanging grass or fern; one was empty, another contained three fresh eggs, and the third young ones about a week old. Visiting the former nest on the 20th November, I found it contained the unusual number of five eggs. On the 5th December I found a nest with three fresh eggs, another by the side of the road at Detention River, with three slightly incubated eggs, on the 28th December, and on the 16th January, 1887, one some ten yards above high water mark with three fresh eggs. Near Hobart on the 24th October, 1898, I found a nest with three eggs in a paddock behind sand banks bordering Bellerive Beach."

Writing on the 16th September, 1902, from Waratah, Mt. Bischoff, Tasmania, Mr. E. D. Atkinson states:—"We note that *Anthus australis* was absent all the winter, and has just come back to us. This species and *Rhipidura diemenensis* migrate to the coast, probably on account of the scarcity of food here."

The nest, a rather deep cup-shaped structure, is formed in a hollow scraped in the ground, of which the rim is neatly pressed down and flush with the surface, the inner cup averaging about two inches and a half in diameter by one inch and three quarters in depth. It is usually formed entirely of dried grasses, but some nests are lined at the bottom with horse-hair. Generally it is sheltered above by an overhanging tuft of grass, and is sometimes placed amongst low rushes or weeds. The nest, although as a rule well concealed, is not difficult to find, the anxious alarm note of the sitting bird, after being flushed, is a pretty sure indication to an intruder that he is in the vicinity of it. In my early collecting days near Melbourne, we use to quietly visit the known nesting haunts of this species at night, flush the sitting bird, and either discover the nest at once, or by marking the spot find it on the following morning.

Curious nesting sites are sometimes selected by the Australian Pipit. A nest presented to the Trustees of the Australian Museum by Mr. A. M. N. Rose, is built inside an old rusty preserve tin, measuring four inches and a half in length by three inches and a half in diameter; the entrance to it is narrowed to two inches by a small platform of dried grasses, which protrudes out of the mouth of the tin. This nest was found on the 24th November, 1896, at Campbelltown, and contained two slightly incubated eggs. The tin, which has the lid still attached, but bent at a right angle, was laying exposed on the ground, without shelter or concealment of any kind beyond a few short blades of dried grass. This nest was figured in the "Records of the Australian Museum," Vol. III., pl. IV. (1897).

A photograph of a similarly placed nest was forwarded me by Mr. Chas. G. Gibson, together with the following note:—"At Lawler's, in the East Murchison District, Western Australia, I found on the 21st December, 1906, a nest of *Anthus australis*, with three heavily incubated eggs, built inside an empty fruit tin laying on the ground; the position struck me as being rather an unusual place."

Surgeon General W. D. C. Williams (Trustee) also informs me that he has a nest of *Anthus australis*, containing two eggs, built in the basal half of a beer bottle, which was found by a teamster upright near a log, at Kalgoorlie, Western Australia.

The eggs are usually three, sometimes four, in number for a sitting, and only on the occasion referred to by Dr. Holden have I heard of five eggs being the complement. They vary from oval to elongate-oval in form, the shell being close-grained, smooth and more or less lustrous;

typically they are of a dull greyish-white ground colour, which is almost obscured with freckles of slaty-brown and umber-brown, uniformly distributed over the surface of the shell. In others the markings have a faint purplish wash, while in some specimens they are confined principally towards the thicker end, where they are confluent and form a more or less well defined zone. A set of three taken at Canterbury, New South Wales, on the 11th August, 1899, measures as follows:—Length (A) 0·86 × 0·65 inches; (B) 0·85 × 0·65 inches; (C) 0·87 × 0·63 inches. A set of four, taken at Belmore on the 23rd December, 1900, measures:—Length (A) 0·9 × 0·65 inches; (B) 0·92 × 0·65 inches; (C) 0·92 × 0·63 inches; (D) 0·9 × 0·64 inches.

August and the four following months constitute the usual breeding season of this species in Eastern Australia. In the neighbourhood of Sydney nests with eggs are more frequently found during the latter end of September and early in October, and less often again towards the end of November. I have noted young birds in the nest on the 18th of January. At Mudgee Mr. J. D. Cox and Mr. A. G. Hamilton found nests with eggs from the 1st of August to the 20th November. A nest with three eggs in the Group collection, together with the entire surroundings, I procured at Dobroyde, in September 1889, by cutting out a square of earth and removing it in a closely fitting box. Mr. E. D. Atkinson writes that he took a set of fresh eggs near Table Cape, North-west Coast, Tasmania, on the 23rd January, 1892.

Family ALAUDIDÆ.

Genus MIRAFRA, *Horsfield.*

Mirafra horsfieldi.

HORSFIELD'S BUSH LARK.

Mirafra horsfieldii, Gould, Proc. Zool. Soc., 1847, p. 1; *id.*, Bds. Austr., fol. Vol. IV., pl. 77 (1848); *id.*, Handbk. Bds. Austr., Vol. 1., p. 404 (1865) (part).

Mirafra horsfieldi, Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 604 (1890).

ADULT MALE—*General colour above dark brown, with ashy-brown margins to all the feathers, rufous in some specimens; upper wing-coverts and quills dark brown, broadly margined with rufous, except on the outermost primaries; tail-feathers blackish-brown, the central pair having ashy-brown or rufous margins, the outermost feather on either side white, except at the basal portion of the inner web, the outer web of the penultimate feather white; over the eye a distinct buffy-white stripe; ear-coverts rufous, mottled with dark brown; chin and throat buffy-white, remainder of the under surface very pale creamy-buff, the feathers on the fore neck and chest with triangular-shaped markings of dark brown; under tail-coverts pale buff. Total length in the flesh 5·3 inches, wing 2·87, tail 1·9, bill 0·5, tarsus 0·85.*

ADULT FEMALE—*Similar in plumage to the male, but slightly smaller.*

Distribution—Queensland, New South Wales, Victoria.

THE present species inhabits the eastern portion of the Australian continent, Gould separating it from *Mirafra javanica* of Java, on account of its ashy-brown instead of rufous margins to the feathers of the upper parts. There is, however, considerable variation in specimens obtained in New South Wales, due, I believe, to the different seasons in which they were procured. Adult examples now before me from Goulburn have the feathers of the upper parts margined with ashy-brown, and which are much worn and abraded; the under parts, too, are very much paler and almost destitute of the triangular-shaped blackish-brown markings on the

fore neck and chest. Adult specimens obtained in June at Campbelltown, have the margins of the feathers on the upper parts rufous, and almost entirely agree with Dr. R. B. Sharpe's description of *Mirafra javanica* in the "Catalogue of Birds in the British Museum." * I believe this is also the typical newly moulted plumage of *M. horsfieldi*.

Horsfield's Bush Lark frequents open plains, grassy flats and cultivation paddocks. It is usually a solitary species, and when flushed only flies a few yards with a peculiar jerky flight, remaining for a second with quivering wings before suddenly dropping into concealment again, and, as pointed out by Gould, it will frequently allow itself to be almost trodden on before it will rise. I first met with this species at Moonee Ponds and the Keilor Plains, near Melbourne, and during many years' residence there observed it in favourable situations in different parts of that State. At Canterbury and Campbelltown, in New South Wales, I have noted it throughout the year, except during periods of drought. In North-western New South Wales I met with it in November, at East Narrabri and Moree.

It is one of our most pleasing songsters; especially is it to be heard on bright moonlight nights about midsummer, flying slowly about high in the air, apparently filled with pleasure at the continued sweet and varied notes at its command.

For the purposes of breeding a cup-shaped hollow is scraped in the ground, and this is thickly lined with dried grasses, the back portion being slightly domed or hooded, protecting the lower part of the structure; others are more globular in form, with an enlarged entrance level with the ground. An average nest measures internally two inches and a quarter in diameter by two inches and a half in height. Generally it is well concealed in a grass tuft, or built in a growing crop. At Moonee Ponds Mr. H. G. Liscombe first pointed out one to me in the latter situation. It was discovered by watching the old birds carrying food in their bills, and always descending in the same place. On making an examination the nest was found, containing two young ones and an addled egg. Later on several more nests were found in the surrounding grass paddocks, and always by watching the birds. One I found on the 14th January, 1882, was built in rather an unusual situation, it was placed among some grass stalks growing through the thorny brambles of a briar bush, and contained three fresh eggs.

The eggs are usually three, sometimes four in number for a sitting, oval in form, some specimens being rather pointed at the smaller end, the shell being close-grained, smooth and lustrous. They are of a greyish-white or yellowish-grey ground colour, which is thickly freckled all over with dark grey or greyish-brown; in some specimens the markings are confluent towards the larger end, and form a more or less distinct zone. Typically the eggs of this species resemble a variety of the eggs of *Anthus australis*, but they are, of course, much smaller. A set of three, taken on the 14th January, 1882, measures:—Length (A) 0·79 × 0·55 inches; (B) 0·78 × 0·59 inches; (C) 0·78 × 0·5 inches. A set of four, taken at Canterbury on the 28th December, 1893, measures:—Length (A) 0·8 × 0·56 inches; (B) 0·81 × 0·55 inches; (C) 0·8 × 0·54 inches; (D) 0·82 × 0·49 inches.

Young birds assume the plumage of the adult shortly after leaving the nest, but the rufous margins of the feathers of the upper parts are narrower, and the tail feathers are remarkably short, being only 0·3 inches in length. Wing 1·8 inches.

Horsfield's Bush Lark is a late breeder. I have found nests with eggs in November, eggs and young in December, and fresh eggs on the 14th January. Dr. Ramsay obtained a nest with three fresh eggs on the 4th February, and there are adults, fledgelings and a nest and young in the Australian Museum collection obtained by Mr. A. M. N. Rose at the end of February.

* Vol. XIII., p. 602 (1890).

Mirafra secunda.

RUFOUS-WINGED BUSH LARK.

Mirafra horsfieldi (part), Gould, Handbk. Bds. Austr., Vol. I., p. 404 (1865).

Mirafra secunda, Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 603 (1890); Hartert, Nov. Zool., Vol. XII., pp. 236-237 (1905).

Mirafra horsfieldi (non Gould), North, Trans. Roy. Soc. S.A., Vol. XXII., p. 141 (1898).

ADULT MALE—*Similar to MIRAFRA HORSFIELDI, Gould, but slightly darker, with a larger amount of rufous on the wing, the lesser and median upper wing coverts being entirely rufous. Total length 5.2 inches, wing 2.85 tail 1.9, bill 0.42, tarsus 0.75.*

ADULT FEMALE—*Similar in plumage to the male, but smaller. Wing 2.65 inches.*

Distribution—North-western Australia, South Australia, Central Australia.

THIS is a close ally of the preceding species, and was separated by Dr. R. B. Sharpe on account of the greater extent of rufous on the wings, his description being taken from a South Australian bird. The above measurements are those of an adult male obtained at Modbury on the 22nd June, 1907, and of an adult female procured at Tea-tree Gully on the 2nd July, 1207. Both of these birds were shot by Dr. W. A. Angove, and the localities are in the neighbourhood of Adelaide, South Australia. With them he sent the following note:—"I am sending you two skins, male and female; they are of a much redder type than the specimen of *Mirafra horsfieldi* you sent over. They are only found in crop or stubble lands, and they are late breeders. I have the eggs of this bird, and they are practically identical with the eggs received from the McDonald Ranges, Central Australia, and which you identified as those of *Mirafra secunda*."

From South Australia Mr. W. White sent me a set of eggs, and wrote as follows:—"Taken at the Reed Beds, near Adelaide, on the 5th November, 1892. The nest was in a grass tussock in a swamp, that the water had recently dried off. The nest differed from any I had seen before, being partly covered on one side, resembling a child's cradle, and contained three fresh eggs."

Dr. Ernst Hartert records in "Novitates Zoologicae" ² eleven specimens from North-western Australia, under the trinominal name of *Mirafra javanica secunda*, and remarks:—"Distinctly more sandy, paler, and not so blackish above as *M. javanica horsfieldi*." This applies to birds from North-western Australia, but not to specimens obtained in South Australia, which are distinctly darker than examples of *Mirafra horsfieldi*, procured in New South Wales. Dr. Hartert, also writing on the forms of *Mirafra javanica*, accords *Mirafra woodwardi*, Milligan, subspecific distinction from the former, and refers to it under the trinominal name of *Mirafra javanica woodwardi*.

Mr. F. L. Whitlock obtained both forms in the same localities, specimens of which were presented to the Trustees of the Australian Museum by Mr. H. L. White, of Belltrees, Scone.

Referrable to *Mirafra secunda* are the following notes made by Mr. G. A. Kearland, while a member of the Calvert Exploring Expedition in North-western Australia, in 1896-7:—"On the grassy flats, which extend for some distance on each side of the Fitzroy River, these birds are so numerous as to convey the idea that the head quarters of the species is in that locality. When we arrived at the lagoon near the river mentioned, on November 6th, I was surprised at their numbers. As we passed along a constant succession of birds kept rising from the ground and flying to the right and left of our line, but seldom went more than twenty yards before they again settled. It was impossible to throw a stick in any direction without disturbing several. Around the lagoon they were found in such numbers as to remind one of Sparrows in a dry

* Nov. Zool., Vol. XII., p. 237 (1905).

thistle field. They were very plentiful near the Fitzroy River Telegraph Station, and at Mount Campbell, where they were found breeding in February. Their nests are usually placed near a small tussock of grass, or in a slight hollow formed by the pressure of a horse's foot; the material used to line them is fine grass."

A set of four eggs taken by Mr. Kearthland in February, 1897, are oval in form, the shell being close-grained, smooth and lustrous. They are of a pale yellowish-grey ground colour, thickly covered with numerous freckles of yellowish-brown, intermingled with faint underlying dots of slaty-grey, and measure as follows:—Length (A) 0·8 × 0·57 inches; (B) 0·75 × 0·55 inches; (C) 0·77 × 0·57 inches; (D) 0·77 × 0·57 inches. A set taken by Mr. W. White at the Reed beds, near Adelaide, South Australia, on the 5th November, 1892, are of a greyish-white ground colour, which is thickly mottled all over with brownish-grey markings:—Length (A) 0·81 × 0·56 inches; (B) 0·82 × 0·55 inches; (C) 0·78 × 0·57 inches. There is nothing to distinguish the eggs of *Mirafra secunda* from those of *M. horsfieldi*; eggs of the former, however, taken in North-western Australia, are the most lustrous I have seen of any species.

As will be seen from the preceding notes, the Rufous-winged Bush Lark is, like its ally, also a late breeder, November and the three following months constituting its breeding season.

Mirafra woodwardi.

WOODWARD'S BUSH LARK.

Mirafra woodwardi, Milligan, Vict. Nat., Vol. XVIII., p. 26 (1901).

ADULT MALE—*General colour above cinnamon, with indistinct brown centres to the feathers which are almost invisible on the hind neck; wings cinnamon, showing brown centres to all the quills when spread, except on the innermost secondaries; tail feathers cinnamon with brown centres, the lateral feathers white, washed with cinnamon, the penultimate feathers broadly margined with brown on the inner web; forehead, crown of head, nape and sides of head cinnamon with indistinct brownish centres to the feathers on the crown of the head; throat white, washed with cinnamon, remainder of the under surface and under tail-coverts pale cinnamon; "bill fleshy-horn colour; legs and feet fleshy colour; iris hazel"* (Carter). *Total length 5·8 inches, wing 2·95, tail 2·1, bill 0·45, tarsus 0·65.*

ADULT FEMALE—*Similar in plumage to the male; in some specimens having larger and darker centres to the feathers of the upper parts.*

Distribution—North-western Australia.

THE above description of the adult male is taken from a fine old specimen procured by Mr. Tom Carter on the 24th August, 1901, at Point Cloates, North-western Australia, and subsequently presented by him to the Trustees of the Australian Museum. It differs from all other specimens in the collection, by its almost uniform and darker cinnamon colour. Specimens were also received from Mr. H. L. White, of Belltrees, Scone, New South Wales. They were collected for him by Mr. F. Lawson Whitlock, on the De Grey River, North-western Australia, in October, 1908, and the adult males are similar to the latter specimen. Collected in the same month and in the same locality are undoubted specimens of *Mirafra secunda*, and distinguished only from examples of this species, procured by Dr. W. A. Angove at Tea-tree Gully, near Adelaide, South Australia, by the more pronounced cinnamon coloured margins to the feathers of the upper parts. Another adult male procured on the 30th October, 1901, and presented at the same time, is much paler and has larger and darker brown centres to the feathers of the upper part, and the lateral tail feathers are white with a very faint and almost imperceptible cinnamon wash.

Mr. Tom Carter, while resident at Point Cloates, North-western Australia, presented skins of this species to the Trustees of the Australian Museum, and subsequently sent me the following

notes:—"When driving about fifty miles inland from Point Cloates, North-western Australia, on the 31st October, 1900, my attention was attracted by some small Bush Larks of a very rufous colour, feeding in short dry grass by the road side. As I could not be sure of the species I shot three or four, and at once knew it was a bird unrecorded from that locality. On reaching home, and reading descriptions of *Mirafra horsfieldi* and *M. secunda*, I did not feel satisfied that my birds tallied with either of these two, but the skins lay in my cabinet until Mr. A. W. Milligan's description of *M. woodwardi* appeared in 1901, and on sending him one of my skins he pronounced the birds to be identical. On 5th February, 1902, I was in the same locality where I first observed these birds, and after camping at night noted a small bird creeping persistently close round the camp fire, and at last saw her settle on her nest, which was placed in a small hollow, well below the ground level, snugly concealed in a tuft of green grass, and contained five fresh eggs, numerous spotted with greenish-grey on a grey ground, some underlying spots appearing of a faint purplish colour."

A set of four eggs in the collection of Mr. H. L. White, of Belltrees, Scone, New South Wales, and taken by Mr. F. L. Whitlock on the 13th October, 1908, on the De Grey Plains, North-western Australia, are oval in form, the shell being close-grained and its surface smooth and glossy. They are of a dull greyish-white ground colour, which is almost obscured by small mottlings of wood brown uniformly and thickly distributed over the surface of the shell, except on one specimen, where they are more sparingly disposed, and are of a greyish-brown hue:—Length (A) 0·77 × 0·57 inches; (B) 0·77 × 0·58 inches; (C) 0·77 × 0·57 inches; (D) 0·76 × 0·5 inches.

Family PITTIDÆ.

Genus PITTA, Vieillot.

Pitta strepitans.

NOISY PITTA.

Pitta strepitans, Temm., Pl. Col., Tom II., pl. 333 (1825); Gould, Bds. Austr., fol. Vol. IV., pl. 1 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 430 (1865); Sclater, Cat. Bds. Brit. Mus., Vol. XIV., p. 428 (1888).

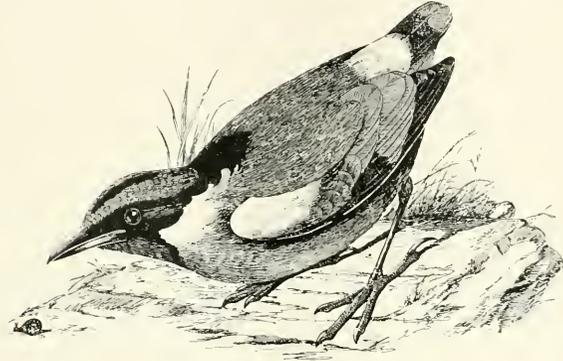
ADULT MALE—General colour above dark green, the feathers of the rump broadly tipped with pale lustrous blue; upper tail-coverts and tail feathers black, the latter tipped with dark green like the back; wings green, the lesser wing-coverts pale lustrous blue; primaries black, brownish at the tips, the third, fourth and fifth with a white band near the centre; lores, sides of the head, nape, hind neck, cheeks and throat black; crown of the head chestnut-brown, with a black streak down the centre; sides of neck, fore neck and breast light fawn colour; a large patch on the centre of the abdomen black; vent and under tail-coverts scarlet; bill dark brown; legs and feet fleshy-brown; iris brown. Total length in the flesh 9 inches, wing 5, tail 2·1, bill 1·1, tarsus 1·5.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Eastern Queensland, North-eastern New South Wales.

THE Noisy Pitta, or "Dragoon-bird," is an inhabitant of the coastal brushes of North-eastern New South Wales, and the greater portion of similarly situated districts in Eastern Queensland. So far as this species is represented in the Australian Museum collection, Comboyne, Camden Haven is its southern limit in the former State, a specimen in the flesh being received on the 4th July, 1906, procured there by Mr. J. L. Brown. Dr. E. P. Ramsay has recorded, however, that a "single specimen was shot near Wollongong in 1883," forty eight

miles south of Sydney. There are numerous examples in the collection obtained on the Bellingen, Richmond and Tweed Rivers, the wing-measurement averaging 5 inches in length, and precisely similar in length to a male and female procured by Mr. George Masters at Wide Bay, Queensland, in October 1867. A gradual decrease in size is perceptible in specimens from the farther north in which they are obtained, examples procured by Messrs. Cairn and Grant



THE NOISY PITTA.

near Cairns, and by Mr. K. Broadbent at Cardwell, having an average wing measurement of 4·65 inches, and almost intermediate in size between *Pitta strepitans* and the smaller race, *P. simillima*, Gould, from Cape York. The feathers of the back, and the scapulars of many adult specimens from all parts of Eastern Australia, have a conspicuous black sagittate marking pointing upwards on the apical portion of the feather.

While in Brisbane Mr. K. Broadbent informed me that he used to obtain, in former years, specimens of the Noisy Pitta in a scrub within a few miles of the city. Later on I visited a brush at the foot of the Condong Range, on the south side of the Tweed River, in Northern New South Wales, where these birds were fairly numerous, and whose notes could be heard in the early morning and just about dusk.

These birds live well in confinement. One Dr. James C. Cox (Crown Trustee) had in an aviary at North Sydney, was particularly lively towards evening, flying about the bare branches of a tree, or hopping along the floor, and emitting a liquid and somewhat mournful note, which Dr. Cox informed me was uttered at intervals throughout the night. Later on he presented this bird to the Director of the Botanical Gardens, Sydney, where I frequently had it under observation, extending over a period of several years, the food given it consisting of small pieces of raw meat, snails, worms and insects. It was very tame, and with an uplifted wing would lay basking in the sun close to the wire of the aviary, while visitors passed within a few feet of it. These birds have a curious habit, while walking about, of constantly lifting the short tail up and down, giving it the appearance of being fastened on loosely with a hinge.

Respecting the birds obtained by Mr. R. Grant in the Bellingen River District, on behalf of the Trustees of the Australian Museum, he has supplied me with the following notes:—"I found *Pitta strepitans* fairly distributed all over the upper sources of the Bellingen River, nearly every little patch of scrub, even when surrounded by clearings, containing a pair or more of these birds, and I have shot them within two hundred yards of the township of Boat Harbour. It is usually a shy and retiring species, and I have known men of middle age, natives of the river, and cedar getters, who had never seen a live Pitta, and were astonished when, by imitating their note, I called one up, shot it and showed it to them. I could always secure these birds, and found that they would come more readily if one could manage to get between two birds calling to one another, and I was almost certain to get both. They live chiefly on land molluscs, and in different parts of the bush I found a good many of their "breaking-grounds," usually a stone, in other places a small stump, which was surrounded with broken *Helices* and other shells."

From Murwillumbah, on the Tweed River, Mr. W. J. Grime wrote me as follows on the 4th July, 1890:—" Dragoon-birds are particularly numerous this year, and very easily got. I have heard it said that they are very shy, but I can assure you that I have the greatest difficulty in getting them sufficiently far from me to fire at without blowing them to pieces. Frequently I have whistled them up, and the first thing I would know was the bird actually sitting within ten feet of me. I have stood up suddenly and stamped my foot to try and scare them off, and in some instances have actually thrown sticks at them, but they simply hopped and kept around me. I have whistled up as many as a dozen in an afternoon, and had them come too near to shoot, and came away without one. Dragoon-birds are more numerous some seasons than others."

From Alstonville, in the Richmond River District, Mr. H. R. Elvery has sent me the following note under date 27th June, 1899:—" I have to report an unusual last season's nesting site of *Pitta strepitans*, which I lately came across, placed on a ledge formed between the spurs of a Booyong tree, at a height of four feet three inches from the ground. This is the first instance in which I have found a nest of this species not built on the ground; usually it is placed between the spurs of a tree, and if on sloping ground always on the lower side. This season my brother-in-law found a nest containing four eggs, the nest being placed between two large stones. The eggs are usually four in number for a sitting, although frequently only three are found. In November, 1897, I took a set of five. This bird breeds during October, November and December."

Mr. Edwin Ashby met with this species in the Blackall Ranges, South-eastern Queensland, and writes:—" I shot a *Pitta strepitans* when about to fly from the top of a tree, about forty feet high; I had only expected to see this species on the ground."

Dr. E. P. Ramsay writes as follows:—" I know of no bird more elegant, and which trips over the fallen leaves and logs, or threads its way through the tangled masses of vegetation with such grace and ease as *Pitta strepitans*. By means of its note, which is easily imitated by trying to whistle the words "want a watch," the bird may be called up within a few feet of its pursuer. I have frequently called it to me, and watched its graceful motions as it would hop on the dead logs, roots and spurs of trees, run along for a few yards, then stop and call and appear greatly excited at not finding its supposed mate. The Pitta is seldom seen off the ground or logs, but sometimes an odd one may be seen perched ten or twenty feet high, calling loudly, as if for amusement. I never saw the Pittas take wing when flushed from the ground; but running noiselessly away with all possible speed, they are soon hidden from view. At times, when seated on a log to rest myself, one has come in sight, walking cautiously along, now running for a few yards, then stopping short, and picking up some unhappy *Helix* which it has discovered by the side of a log, with a sharp rap against the first hard substance it sees breaks the shell and devours the animal. Those who have traversed the brushes frequented by the Noisy Pitta, must have noticed stones against which numbers of land shells have been broken; these are the work of the Pitta, for when it has found a shell not easily broken it runs off with it to the nearest stone, and there by holding it in its bill and rapping it against the stone, soon effects its purpose. I have found a considerable collection of broken shells upon several occasions, consisting of six or eight species, and among these the large *Helix fraseri*. The cracking stones of the Pittas will give a collector a very good idea of what shells occur in the vicinity, and several new and rare species, not hitherto found on the Richmond River, were discovered through the industry of *Pitta strepitans*."

Mr. W. J. Grime forwarded me a nest and set of three eggs taken by him on an unusually early date, the 10th August, 1890. The nest is a large dome-shaped structure, with an entrance in the side, and somewhat resembling a small nest of the Lyre-bird, the basal portion consisting of thin sticks and twigs, the remainder chiefly of bright green mosses, with which are intermingled

dead leaves and skeletons of leaves, and pieces of thin paper-like bark, and has no special lining. Outwardly it measures twelve inches in height by eight and a half inches in diameter, and across the entrance three inches in width by two and a quarter inches in height. It was built on the ground between the buttresses of a Fig Tree, the centre of the lower portion of the structure consisting of small pieces of half decayed wet wood and bits of mould.

The eggs are usually four, sometimes only three, and occasionally five in number for a sitting, oval or rounded oval in form, the shell being close-grained, smooth and slightly lustrous. They are of a delicate white or pale creamy-white ground colour, and are finely dotted and spotted with blackish-brown and similar underlying markings of bluish-grey; frequently an egg in a set has the markings smaller than those on the remainder; in others they are confined to a few small dots on the larger end, with which may be intermingled one or two small irregular-shaped surface or underlying patches of inky-grey. As a rule the markings are uniformly distributed. A set of three taken on the 10th August, 1890, measures:—Length (A) 1·33 × 0·95 inches; (B) 1·35 × 0·97 inches; (C) 1·27 × 0·95 inches. A set of four taken on the 3rd November, 1897, measures:—Length (A) 1·36 × 0·98 inches; (B) 1·37 × 0·99 inches; (C) 1·38 × 0·99 inches; (D) 1·3 × 0·96 inches.

In New South Wales October and the three following months constitute the usual breeding season of this species, but as previously pointed out eggs have been taken in August.

Pitta simillima, inhabiting the Cape York Peninsula, is only a smaller race of *P. strepitans*, wing 4·5 inches, otherwise the plumage of the two are alike. As previously pointed out specimens from Cairns and Cardwell are almost intermediate between the two in size.

Specimens of this intermediate form were obtained by Messrs. E. J. Cairn and Robert Grant on behalf of the Trustees of the Australian Museum, and the latter has given me the following notes:—“We found *Pitta simillima* fairly common, both in the coastal scrubs near Cairns, and the mountain scrubs in the Herberton District. In the former locality, the stone or stump forming one of their ‘breaking grounds’ would be surrounded with two or three buckets full of broken shells, but those on the mountains far less. Pittas suffer very much in the coastal districts near Cairns from a minute tick of a bright red colour. On two occasions I picked up these birds with a scarlet patch under their wings about the size of a shilling, and that could neither run or fly. I could not distinguish any difference in their habits and call note from those of *Pitta strepitans*.”

A set of three eggs, taken by Mr. Bertie Hislop in September 1896, are rounded ovals in form, one specimen being almost globular, and the surface of all is extremely glossy. They are of a dull white, or pale creamy-white ground colour, which is thickly mottled and blotched all over with purplish-brown and underlying markings of violet-grey; on one specimen the markings consist only of small and almost invisible spots and dots of a much lighter shade. They measure:—Length (A) 1·18 × 0·95 inches; (B) 1·18 × 0·95 inches; (C) 1·15 × 0·97 inches.

Pitta mackloti.

MACKLOT'S PITTA.

Pitta mackloti, Temm., Pl. Col., Tom. V., pl. 547 (1834); Gould, Suppl. Bds. Austr., pl. 29 (1869); Selater, Cat. Bds. Brit. Mus., Vol. XIV., p. 436 (1888).

ADULT MALE—General colour above dull green; rump and upper tail coverts blue, the tail feathers slightly darker; quills blackish-brown, paler at the tips, the third, fourth and fifth primaries with a white bar near the centre of the feather; upper wing-coverts and outer webs of the secondaries blue, with a concealed white spot on the lesser coverts; crown of the head reddish-brown, passing into

a dull red on the nape and upper portion of the hind neck, the crown of the head with a few indistinct bluish streaks; chin and cheeks brown; feathers around the eye and the ear-coverts brown washed with blue, which is more pronounced on the tips of the latter; throat black, followed by a broad blue band across the fore neck and chest, and margined below with a narrow band of black; sides of the fore neck and chest dull green; remainder of the under surface and under tail-coverts bright scarlet; bill (of skin) brown; legs and feet brown. Total length 7.1 inches, wing 4.1, tail 1.7, bill 0.9, tarsus 1.6.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Cape York Peninsula (Northern Queensland), New Guinea, Aru Islands.

MACKLOT'S Pitta has a wide ultra-Australian range, occurring in New Guinea and the Papuan Islands, Waigiou, Salwatti, Mysol and the Aru Islands. Of four specimens in the Australian Museum collection, all are labelled "Cape York," two of them, presumably by the tickets, obtained by the late Mr. J. A. Thorpe, while in company with the late Mr. James Cockerell. The late Mr. Gerard Krefft, a former Curator of this institution, first drew attention to the occurrence of this species in Australia in the "Proceedings of the Zoological Society for 1867."* Mr. H. G. Barnard also obtained skins of this species at Somerset, Cape York, in 1896. I have never seen a specimen, or heard of it being recorded in any collection formed in Australia, except on the northern portion of the Cape York Peninsula. From information supplied by the late Mr. James Cockerell, Gould remarks as follows in the Supplement to his "Birds of Australia":—"Pitta mackloti inhabits thick viny scrubs based with stones, and overrun with rank herbage of various kinds. Its mournful whistle, which is most frequently uttered near sundown, is very deceptive, appearing to come from an opposite direction to that in which the bird is stationed; it is, in fact, a perfect ventriloquist. It sometimes leaves the ground, and may occasionally be seen perched on the tops of the highest trees, where it sits very close. One of the nests of this bird found by Mr. Cockerell, was placed in the head of a stump, about six or seven feet from the ground; it was a loose structure of interlaced grasses and fine woody fibres." †

Mr. Bertie L. Jardine, of Somerset, has sent me the following notes:—"Pitta mackloti inhabits the large scrubs in the centre of the extreme northern portion of the Cape York Peninsula. It is migratory in habits, arriving annually in great numbers, probably from New Guinea, but personally I have never seen, or do I know of any one who has seen them during their migratory passage. The first arrivals may be observed about the middle of November, hopping along the ground with the greatest rapidity, and much resembling in their actions the Northern Scrub Robin (*Drynaedus superciliaris*). It is very fond of perching on a log or stone, and uttering a whistling note, resembling in sound as nearly as letters can express it 'Wantok watch.' Macklot's Pitta is undoubtedly a nocturnal species, as its cry may be heard all through the night, especially so in damp and cloudy weather. We also found it to be very destructive to newly planted maize. It must be quite an expert at locating the seeds in the drills, as these depredations are always committed during the night."

The eggs are three or four in number for a sitting, and vary from thick oval to compressed oval in form, some specimens being almost true ellipses, the shell being close-grained, smooth and more or less lustrous. Typically they are of a creamy-white ground colour, which is dotted, spotted, and blotched all over with irregular-shaped markings of purplish-brown intermingled with underlying spots and blotches of purplish-lilac and bluish-grey. A set of three measures:—Length (A) 1.2 × 0.9 inches; (B) 1.23 × 0.88 inches; (C) 1.21 × 0.91 inches. Other specimens have the creamy-white ground colour more or less obscured by numerous indistinct blotches, smears and scratches of pale vinous-purple, intermingled with underlying clouded

* Proc. Zool. Soc., 1867, p. 319. † Bds. Aust., Suppl., text opp. pl. 29 (1869).

patches of faint violet-grey, the markings predominating on the thicker end, where they form an irregular cap. A set of four measures:—Length (A) 1·18 × 0·88 inches; (B) 1·17 × 0·87 inches; (C) 1·17 × 0·9 inches; (D) 1·2 × 0·88 inches.

Immature birds resemble the adults, but are browner on the crown of the head, and have the upper and under parts mottled here and there with a few scattered brown feathers. Wing 4 inches.

Pitta iris.

RAINBOW PITTA.

Pitta iris, Gould, Proc. Zool. Soc., 1842, p. 17; *id.*, Bds. Austr., fol. Vol. IV., pl. 3 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 432 (1865); Selater, Cat. Bds. Brit. Mus., Vol. XIV., p. 444 (1888).

ADULT MALE—*General colour above golden-green; upper tail-coverts green, some of the concealed feathers tipped with blue; lesser wing-coverts lustrous silvery-blue, the tips of the longest rich blue, the whole forming a conspicuous shoulder patch; median and greater-coverts and secondaries of a more pronounced golden shade than the back; primaries brownish-black, paler at the tips, the third, fourth and fifth having a white spot about the middle of the feather; tail-feathers dull golden-green, black at the base, the latter colour increasing in extent towards the outermost feather on either side; entire head, hind neck, cheeks, throat, breast and upper portion of the abdomen velvety-black; a broad stripe extending over each eye and joining on the nape chestnut-brown; sides of the abdomen pale ochreous-brown; tips of the lower flank feathers, centre of the abdomen and the under tail-coverts pale scarlet; bill (of skin) dark brown; legs and feet fleshy brown. Total length 7 inches, wing 4, tail 1·6, bill 0·82, tarsus 1·4.*

ADULT FEMALE—*The sexes are alike in plumage.*

Distribution—Northern Territory of South Australia.

GOULD, who described this very distinct species in the "Proceedings of the Zoological Society" in 1842, remarks:—"Two specimens of this new and beautiful Pitta, both killed on the North Coast of Australia, have already come under my notice. One of these is in the collection of Dr. Bankier, Acting-Surgeon of H.M.S. 'Pelorus,' and the other, apparently a female, is in the British Museum, having been presented to the national collection with many other fine birds by Captain Chambers, R.N. of the same vessel. The Rainbow Pitta differs so much from all other known species of this lovely tribe of birds, as to render a comparison quite unnecessary. Both the specimens above mentioned are from the Coburg Peninsula, where the species is not uncommon, and it will doubtless hereafter be found to range over a great portion of the North Coast. No further account of the habits of this fine bird have been received than that it inhabits the thick 'cane-beds' near the coast, through which it runs with great facility, the boldness and richness of its markings rendering it a most attractive object in the bush."² Gould's figures of this species in his folio edition of the "Birds of Australia," represents the superciliary stripe over each eye as not joining each other on the nape, and unlike any specimens I have seen, being almost as brilliant in colour as the scarlet vent and under tail-coverts. *Pitta iris* is undoubtedly the rarest of any species of Australian Pittidæ in collections, on account of the situations it frequents rendering it very difficult to procure specimens. Mr. George Masters, Curator of the Macleay Museum at the University of Sydney, writing on a "Collection of Birds from Port Darwin," in the "Proceedings of the Linnean Society of New South Wales," † from information supplied him by the collector, the late Mr. Edward Spalding, remarks on *Pitta iris*—"Frequents thick bamboo jungles, scarce and difficult to obtain." In "Novitates Zoologica," ‡ Dr. E. Hartert, records a male and two females from the South Alligator River, in the Northern

² Gould, Bds. Austr., fol. Vol. IV., text opp. pl. 3 (1848).

† Vol. II., p. 237 (1878).

‡ Nov. Zool., Vol. XII., p. 219 (1905).

Territory of South Australia, with the collector, Mr. J. T. Tunney's note, "Caught in the jungles; more plentiful in the jungles near the coast; scarce up the river."

From Mr. J. H. Niemann the Trustees of the Australian Museum have received the eggs of this species, also a fledgeling, together with the following note:—" *Pitta iris* inhabits the dense bamboo jungles near the Daly River, in the Northern Territory of South Australia, and is very difficult to secure. They build in those places on the ground, or in a clump of bamboos, but their nests, formed entirely of dead strips of bamboo leaves and plant sheaths, are so loosely placed together that they will not bear removal. They breed in the early months of the year during the wet season."

The eggs are four in number for a sitting, and vary from a rounded oval to almost globular in form, the shell being close-grained, smooth and lustrous. They are of a dull white ground colour, which is dotted, spotted and sparingly blotched with sepia and underlying markings of inky-grey, the dots and spots usually being rounded in form, and the blotches often of irregular shape. In some specimens the markings are uniformly distributed over the shell; in others they predominate or are confined to the thicker end, but do not assume the form even of an irregular zone. A set of four taken on the 1st February, 1902, measure as follows:—Length (A) 1.02 × 0.84 inches; (B) 1.01 × 0.84 inches; (C) 1.05 × 0.82 inches; (D) 1 × 0.84 inches. A set of four taken on the 2nd February, 1902, measure:—Length (A) 1.1 × 0.83 inches; (B) 1.08 × 0.84 inches; (C) 1.08 × 0.82 inches; (D) 1.1 × 0.82 inches. Of a set of four in Mr. Charles French's, junr., collection, taken on the 15th February, three are white and have numerous freckles, smears and large blotches of pale claret-brown, intermingled with a few spots and blotches of inky and violet-grey, which predominate on the thicker end; the remaining one has small irregular shaped spots of slaty-black, intermingled with underlying markings of dull lilac-grey, and looks as if it belonged to another set. Length (A) 0.99 × 0.87 inches; (B) 1.02 × 0.87 inches; (C) 1 × 0.88 inches; (D) 1.03 × 0.88 inches.

The fledgeling received from Mr. Niemann resembles the adult, but is everywhere very much duller in colour, there is only a very slight indication of the chestnut-brown superciliary stripe, and the dull black feathers on the chin and throat have whitish tips. Wing 3.1 inches. There is also a fledgeling in the Australian Museum collection in almost the same stage of plumage, obtained by the late Mr. Alexander Morton at Port Essington on the 14th February, 1897.

Judging by the dates supplied with a number of sets of eggs I have examined, the breeding season of the Rainbow Pitta commences early in January, and continues the two following months.

Family MENURIDÆ.

Genus MENURA, *Davies*.

Menura superba.

LYRE-BIRD.

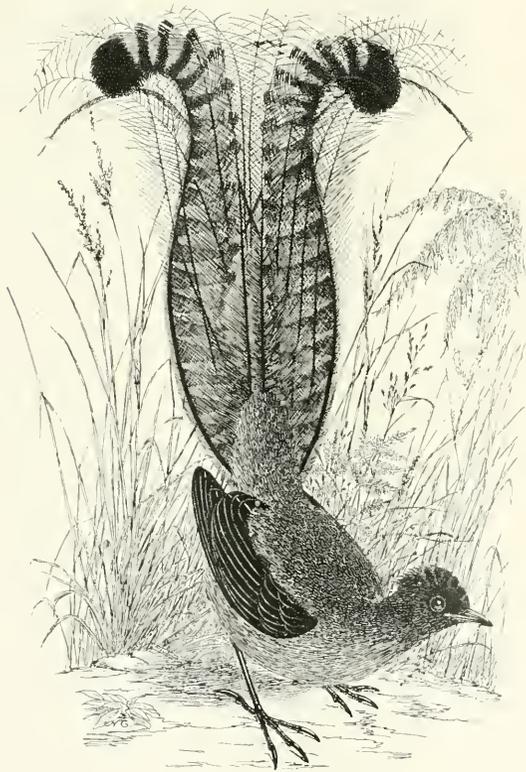
Menura superba, *Davies*, *Trans. Linn. Soc.*, Vol. VI., p. 207, pl. 22 (1800); *Gould, Bds. Austr.*, fol. Vol. III., pl. 14 (1848); *id.*, *Hand-bk. Bds. Austr.*, Vol. I., p. 298 (1865); *Sharpe, Cat. Bds. Brit. Mus.*, Vol. XIII., p. 661 (1890); *id.*, *Hand-l. Bds.*, Vol. III., p. 3 (1901).

ADULT MALE—*General colour above brown, washed with ashy-brown on the hind neck and rump; primaries blackish on their inner webs, brown on their outer webs; secondaries rufous-brown; upper tail-coverts washed with reddish-brown; head and neck dark slaty-brown, the feathers on the crown of the head elongated and forming a slight crest; throat rufous; remainder of the under surface pale ashy-brown, lighter on the abdomen; upper surface of the tail blackish-brown; under surface silvery-grey, two centre tail-feathers brown, webbed only on their outer edge and crossing each other, the next six feathers on either side having long lateral filaments, carrying from four to six inches in length,*

the feathers next the central pair of feathers being webbed for a third of their length from the base, the webs gradually decreasing in extent towards the external feathers, which are but slightly webbed there; external tail-feathers curved outwardly for two-thirds of their length, and recurved again at the tips, the outer webs narrow, dark silvery-grey and tipped with black: inner webs, broad, of an ashy grey tint washed with rufous, and edged and tipped with black, and having darker rufous notch-like markings, which appear transparent when held against the light: bill, legs and feet black; iris dark brown. Total length of skin 38 inches, wing 11, tail 24, bill from forehead 1.75, tarsus 4.5.

ADULT FEMALE—Does not possess a lyre-shaped tail like the male, but has all the tail feathers broadly webbed, the two centre ones being the longest and their inner webs narrower: the outer tail-feathers are slightly curved, and notched on the inner webs, with rufous markings. Total length 32 inches, wing 9.9, tarsus 4, central tail-feathers 18.5, outer tail-feathers 12.

Distribution—Eastern New South Wales.



LYRE-BIRD

LYRE-BIRDS, which are represented by three species belonging to the genus *Menura*, are exclusively confined to the south-eastern portion of the Australian continent. Following Professor Newton and Mr. Garrod, Dr. R. B. Sharpe, in the "Catalogue of Birds in the British Museum," places them at the end, among the abnormal Passeres, their only ally in this subdivision of the Order being the SCRUB BIRDS belonging to the family *Atrichidae*, another strictly Australian group. Later on in his "Hand-list of Birds," he institutes the Order *Menuriformes* for their sole reception. The wings are short and rounded, the legs and feet strong, with long claws, and the feathers in the tail of the fully-plumaged male are long and of abnormal form. In two species, *M. superba* and *M. victoria*, the exterior tail-feathers in the adult male assume the form of a lyre. The inner webs of these feathers are, moreover, notched with chestnut markings, which, when held before the light, appear transparent. On examination it will be found that the barbs of

the feather, at the notches, are devoid of barbules. These birds chiefly frequent humid mountain ranges, or the coastal brushes, and breed in the depth of winter. In addition to their rich and melodious notes, these birds are possessed of wonderful powers of mimicry. From the lengthened form of the tail-feathers, all three species in the country districts are locally known as "Pheasants."

The Lyre-bird (*Menura superba*) frequents the dense scrub-covered ravines and the fern clad gullies of the mountain ranges of Eastern New South Wales. To a less extent it haunts the tropical undergrowth of the rich coastal brushes, its range extending from the neighbourhood of the Richmond River in the north, almost to the southern boundary of the State.

The male Lyre-bird is far more frequently heard than seen, but occasional glimpses of it may be sometimes caught as it quickly runs across one's path on some mountain track. The long outer tail-feathers, however, are crossed and carried in a line with the body, so the beauty of its tail is not seen. To see and hear the bird to advantage, one must follow it to its usual scratching mound. These are low hillocks about three feet across, which these birds rake up in the damp soil of the scrubs. Choose a bright, crisp day in July, when the female is engaged in the duties of incubation, and the male is in perfect plumage. From the track on top of a mountain range one hears the loud liquid-like notes of the male in a fern gully far below. Slowly descending as noiselessly as possible, and taking care to proceed only while the bird is calling, one passes through the tangled undergrowth, or over fallen timber. The bush gets thicker as one gets lower down, and only occasional rays of the sun dart through the leaves of the surrounding musk and sassafras trees. Nearing the bottom of the gully a thick canopy of fairy-like fern fronds is overhead covered with sparkling dew-drops; underneath are graceful festoons of climbing plants, the stems of the ferns being hidden in a luxuriant growth of epiphytes and cryptogams. A Rose-breasted Robin flits past echoing its monotonous "tick, tick, tick," otherwise all is silent. The notes of the Lyre-bird are stopped, and one rests awhile, for although it was clear and bracing on the top of the range, coming into contact with the damp undergrowth coupled with the moisture-laden atmosphere, and the exertion of the descent, one is bathed in perspiration. On the opposite side of a creek near at hand one hears the clear, confident swish-like crack of the Whip-bird, followed by the slow harsh grating cry of the Funereal Black Cockatoo, this is succeeded by the shrill notes of the Pied Crow-shrike, and the low whistle of the King Lory; what a veritable bird paradise is this place. In the same direction again is heard the loud natural notes of the Lyre-bird. Carefully crossing the bed of the creek, and getting on the other side, one crawls nearer as he is engaged in his song, hardly daring to lift a foot, for the snapping of a twig, or the rolling of a pebble is enough to alarm this timid bird. Gently pushing one's way through an undergrowth of ferns, and keeping well within the shelter of the stems of the intervening tree-ferns, it is possible to get within a few yards of the bird. Through the ferns, by dint of perseverance and good fortune, one may see a fine old male swiftly gyrating on his fern encircled playing-mound, and seemingly intoxicated with the pleasure of his rich and varied *repertoire*, but far more often will he catch only a momentary glimpse of the tips of his tail-feathers, which are carried erect. Now he is engaged scratching and searching for insects, and inwardly repeating in low notes to himself his largely acquired vocabulary of other species. This does not last long, for his loud and joyous notes again burst forth, as he quickly twists and turns on his mound. To gain a better view one risks stepping very quietly on to a fallen branch, or stone; at the same time there is a slight movement in the low ferns on the opposite side of the mound, and one's Whip-bird, Black Cockatoo, Pied Crow-Shrike and King Lory have all vanished in the form of the wary mocking bird who has just been disturbed from his well raked play ground.

It is satisfactory to know that this species may be found within seven miles of Sydney. Frequently while fishing have I listened to the loud notes of the male, in the rocky gullies of the upper parts of Middle Harbour. During a very hot, dry summer, when bush fires were prevalent in this neighbourhood, a female sought refuge in the fowl-yard of Mr. J. Fitzsimons, near the railway line at Gordon, and was subsequently presented to the Trustees of the Australian Museum. At Roseville Park I heard one of these birds when in company with Mr. R. N. Meikle, on the 11th August, 1907. It was in a gully running into Middle Harbour that we stealthily

crept down close to a male Lyre-bird, and listened to him at intervals from 4.30 p.m. to 5 p.m. going through his mimicry of different sounds. It chiefly took place, we afterwards found out, on his scratching mound, and as we were standing ten feet above him, and about ten yards away, we heard him to advantage, while I timed him with watch in hand. After repeating his clucking note common to the species as he ran over the leaves, he remained silent for three minutes. Then in the following order he imitated these sounds:—The croaking note of a tree-frog, repeated for ninety seconds, followed for three-quarters of a minute by the notes of Pennant's Parrakeet, then the notes of these species in somewhat rapid succession, the average time for each varying from twelve to fifteen seconds:—Laughing Kingfisher (*Dacelo gigas*), Whip-bird (*Psophodes crepitans*), Butcher-bird (*Cracticus destructor*), Pied Crow-Shrike (*Strepera graculina*), Black-faced Cuckoo-Shrike (*Graucalus melanops*), Yellow-breasted Robin (*Eopsaltria australis*), Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*), Harmonious Thrush (*Collyriocincla harmonica*), and then was silent for four minutes before again starting his mimicry, save the usual short intermittent clucking note previously referred to. There was no regular order in which the imitations were uttered, and sometimes one or more would be entirely omitted; in one instance only during our stay did the notes resemble the short yelping bark of a dog.

Not only do the Lyre-birds imitate the notes of the birds around them, but also any sounds they may hear in the bush, such as the noise made by timber-getters in using an axe or a cross-cut saw. The males are far shyer than the females, their attractive notes and lyre-shaped tails causing them to be more sought after than their less pretentious consorts. As each pair of these birds, if undisturbed, rear but one young one in the year, it is to be hoped that the wholesale destruction of this species in the past will be put a stop to, or it will be only a question of time when the Lyre-bird ceases to exist, except in inaccessible mountain ravines and gullies. Let Australians jealously guard and protect these birds, for not only have they to contend against human enemies, but many of them are killed by dingoes and the acclimatised foxes, especially the females when engaged in the duties of incubation. The Lyre-bird still breeds in the gullies about the head of Middle Harbour.

Although sometimes inquisitive, usually these birds are excessively shy and wary, but Mr. E. G. W. Palmer, of Lawson, informed me that in very cold winters they have visited his place and mixed among the fowls at feeding time. I also heard of a similar instance in the Illawarra District.

The following appeared in a daily newspaper under date 15th April, 1902:—"Taming the Lyre-bird: Lawson, Saturday.—Owing most probably to the scarcity of food caused by the long spell of dry weather, and the extensive area of country swept by bush fires, the extremely shy Lyre-bird has been driven from its haunts, and forced to seek food at habitations. Two are located at some stables, another in a garden, and four were lately picked up by the railway duplication men in their camp, all as tame and quiet as an ordinary fowl."

From Mount Victoria, on the Blue Mountains, Mr. W. C. Plummer sends me the following note:—"As illustrating the inquisitive nature of the Lyre-bird, the following incident occurred at Mount Victoria about 1896. My friends Mr. Duke Wynter, of Marrickville, the late Mr. Arthur Wicken, of Sydney, and myself had spent the day shooting in Kanimbla Valley, and having bagged a wallaby, were climbing the mountain in the evening, on our homeward way, carrying the wallaby suspended from a pole between us. When we reached the base of the cliffs, feeling tired with our load, we rested a few minutes, and were surprised to see two Lyre-birds, apparently a male and a female, run out from behind a rock, pass close by us, and disappear round another rock. These birds being usually very shy and difficult to approach, made the circumstance appear rather remarkable. Evidently the sight of their friend the wallaby in so unusual a predicament, had keenly excited their curiosity, and they had ventured out to investi-

* "Daily Telegraph," 15th April, 1902.

gate. Having rested a few minutes, we resumed our climb for about two hundred yards further, and again rested, when we were much amused once more to see two Lyre-birds, no doubt the same pair, run out from a large rock close to us, then fly about five or six yards down the mountain and perch on a projecting limb of a tree, where they remained watching us for a few minutes, till a sudden movement of one of our party frightened them away, and we saw them no more, perhaps because we had then almost reached the top of the mountain, and soon left the cliffs behind."



NEST OF LYRE-BIRD.

The food of this species consists of insects of various kinds, worms, terrestrial crustacea and small land molluscs, which are usually obtained under fallen leaves in damp parts of the scrub.

The nests of the Lyre-bird are built in the luxuriant vegetation growing on the sides of secluded gullies and mountain gorges, and are usually on or within three or four feet of the ground, but some placed in thick forks or stumps of trees, surrounded with scrub, or in rocky chambers, may be twelve to twenty feet high. They are large rounded oval structures, with an entrance in the side, and are outwardly composed of thin sticks, twigs, dried fern-leaves and mosses, neatly lined inside with bark fibre, wiry rootlets, and long downy feathers from the flanks and back of the parent birds. Some nests have a stairway formed of sticks obliquely crossed from the entrance of the nest to the ground, and which is used by the birds when gaining access to or leaving the nest. This is more often the case when the nest is built between the stems of two small trees, and no means are provided for ingress and egress. Sometimes the nest is built on a ledge of rock, at other times in the tangled roots of some fallen giant of the forest, or in the end of a hollow log; not infrequently it is concealed in the fronds at the top of a leaning tree-fern, whose slanting and roughened stem forms an easy mode of access to it. These birds often desert a nest if the

female is flushed while sitting, unless it contains a young one.

Although one usually associates the nesting place of the Lyre-bird with damp fern gullies, luxuriant vegetation and cool shady creeks, sometimes it is situated in the most dry and barren parts of the country, in almost inaccessible rocky caverns. On the 22nd August, 1907, near Colo Vale, in company with Mr. N. Etheridge and Mr. W. Chalker, I photographed and assisted in procuring a nest of this species the latter had found. It was in one end of a rocky chamber

fifteen feet in length, six feet in height and five feet in depth, on a cliff side, the lower portion of it being eight feet from the bare sandy soil. The nest was a very large one, constructed of the usual materials, and measured three feet in height, two feet six in width, and six inches across the aperture. Although the nest was easily seen, it could not be approached without the bird observing an intruder. On the following day we left early in the morning to obtain another nest that Mr. Chalker had found the previous month, and which he had visited in company with Mr. N. Etheridge nineteen days before, when it contained a cold, chipped, and apparently deserted egg, in which the latter several times thrust a large pin, reaching nearly half way through an embryo. The nesting place was in a small opening in the pinnacle of a bare rock, in the gorge of the Upper Nepean River, one of the roughest parts of New South Wales. It was on the opposite side of the gorge from where we stood, and it looked like a sheer blank wall of rock. We arrived at the nest, and on removing some boulders I proceeded to photograph it; the structure was of the usual form, with a stairway of sticks, being about fifteen feet up. After being there about twenty minutes we were all surprised to hear the sharp shrill call, as we first



LYRE-BIRD (NESTLING.)

supposed, of the female in the vicinity, but we afterwards found it proceeded from a young one in down in the nest. After a hurried lunch down at the river, we returned up the opposite side, arriving at the brink of the gorge precisely five hours after leaving it. This nest has now been mounted and placed in the Australian Museum, together with the nestling, which lived three days. The nest measures two feet six inches in height, one foot six inches in diameter, and six inches across the aperture.

Mr. George Savidge, of Copmanhurst, sends me the following notes:—"In the Cangai scrubs, and on the upper waters of the

Clarence River, the blacks found eight eggs of *Memura superba* before the end of June 1896, eleven eggs in July, and seven in the first week in August. Last year this species was nearly a month later in nesting; probably the exceptionally frosty season had something to do with this. The nests were found in a variety of situations; some were placed on shelves of rocks twenty-five feet high, and quite inaccessible, others were placed on the top of tall stumps, or between the spurs of fig-trees, and one was found in a large stag-horn fern growing on the trunk of a tree. One bird nearly touched the black's hand as it flew off its nest. The lining consists of feathers from the bird itself, and is much the same colour as the egg. A few of the eggs were hard set upon, but no nests were found which contained young up to the 6th of August."

With the accompanying plates of nests of the Lyre-bird, Mr. Savidge has sent me the following notes relative to his photographing them:—"I sent the aboriginal 'Cobby' to the Cangai scrubs about the middle of June, 1909, to search for the nests of *Memura superba*, and have them found as close as possible, arranged that he should stay there till I came up. You can judge of my surprise when he put in his appearance at Copmanhurst the night before

I had arranged to start ; however, he seemed willing to undertake the journey back again, so I had to find a horse for him as well as the horses I was using for myself. We left Copmanhurst early the next morning, accompanied by Senior-Constable George Calman, and arrived at the foot of the Cangai Range the same evening ; we still had a journey of five or six miles to get to the



NEST OF LYRE-BIRD (*in situ.*)

scrubs 'Cobby' had found the nests in. We were up at daylight next morning, and the ride up the mountain was steep and rough ; it took us nearly two hours to cover a distance of a little over four miles to the edge of the scrub.

The first nest visited was the one on the ground ; it was placed in an exceedingly rough and rocky place, at the head of the left hand branch of Cangai Creek, on the shady side of the

mountain: it was a very dark place: to give you some idea of the light there, I gave six and a half minutes exposure, using the same stop as I used for the Kite's nest forwarded you; the latter picture I gave eight seconds. The nest is, as you see, situated on the rocky ground by the side of a tree and a mass of dead fallen timber; the place was so rough and rocky that there was only a small space on which I could erect my camera, and I had to strap a piece of sapling to the leg of the tripod to get it to stand at all, and to make up for the unevenness of the ground. I had some difficulty to get a position to see the stop on my lens; however, it came out fairly well. The next place visited was in the same locality, and was the nest situated about eighteen feet up on the side of a precipice, and many feet to the top. We then crossed the spur (all in thick dense scrub) to the left hand branch of Hill's Creek, and there took the photograph of the one in the burnt out stump of a Tallow-wood tree. This nest was on the edge of the scrub; the light was much better there, and the sun shone through in places. This picture I gave a little over one minute exposure, and the nest was about eleven feet from the ground; it was just ready for an egg. The other one on the ground contained a very peculiar shaped egg, nearly round. I have a fine series of these eggs now, one in particular being a very light stone colour. We spent a very pleasant day, but a very strong westerly wind was blowing, which made bush travelling dangerous. We came across one monstrous tree that had just been blown down. *Menura superba* builds in all sorts of positions. One nest was found on the top of a Grass-tree (*Xanthorrhoea* sp.) In the breeding time the male bird sings out at intervals all through the night. Usually when they are going through their corroboree, they go to their bare mound and prance round, fanning and whisking their tail, which they make tremble again. They are plentiful in these scrubs."

Instances of the Lyre-bird living in semi-domestication, or in confinement, are not uncommon, although the latter is far more so than the former. Only once, however, have I known the Lyre-bird to have been successfully taken alive to Europe. From information and notes received from M. Leon Jaubert, of North Sydney, I have extracted the following:—"Hearing from Mr. E. P. Ramsay, Curator of the Australian Museum, Sydney, that a Mr. Rose, farmer of Webb's Creek, near Wiseman's Ferry, on the Hawkesbury River, had a pair of tame Lyre-birds, I went up there on a shooting expedition, and called at his place to see them. I found them running with the fowls and perfectly tame. Mr. Rose informed me that he had several times taken young birds from the nests, and after rearing them and letting them have the run of the bush with the fowls, they all had mated with wild birds and forsook the place. The pair of birds then in his possession had been hatched from eggs taken from the nests at the same time, and placed under a domestic fowl, but he did not inform me of the length of period of incubation. These birds were exceedingly tame, and would take curds out of the mouth of the farmer, or his daughter, or eat anything out of their hands. Finally I purchased the birds, and stayed there four days shooting in and about the neighbourhood, and then returned to Sydney with them. As I intended shortly leaving with the Lyre-birds for France, I put an advertisement in the 'Sydney Morning Herald,' offering to purchase twenty thousand live worms. These I succeeded in obtaining, and placed about an equal number of each in twenty casks of good soil, and also purchased one hundred weight of curds, which was placed in the cooling chamber. On the 21st of April, 1885, I took the French steamer 'Sydney,' and Captain Pellegrin, the commander, gave me all possible help to succeed in my attempt to take the birds alive to France. I fed the birds regularly every day on about two pounds of curds, for this they would fly up on to my shoulders, and take it out of my mouth, and placed half a barrel of fresh soil in their cage, from which they extracted the worms as they required them. At that time the French steamers called at Mauritius, Bourbon and the Seychelles, on their way to my birthplace, Marseilles. Just at day-break on the morning prior to our arrival at the latter place, the female died from the effects of the great heat, while passing through the Red Sea. The male bird was landed in splendid condition, and remained or about a month at the Acclimatization Society Gardens at Marseilles. I then made arrange-

ments with M. Milne-Edwards, Director of the Jardin des Plantes in Paris, presenting the bird to that institution, where it was placed in a very large aviary. I gave full instructions to the keeper there how to feed it and look after it, and it thrived well, living for a period of five and a half years, and where I saw it several times during my different trips to Europe."



NEST OF LYRE-BIRD (*in situ.*)

Only one egg is laid for a sitting. Typically they vary in form from oval to elongate oval, the shell being finely granulate and slightly lustrous. In ground colour they vary from a light stone-grey to deep purplish-brown, having short streaks, spots and blotches of different shades of deep slaty-grey and dark blackish-brown equally distributed over the surface of the shell. In some specimens these markings predominate on the thicker end, where they form a distinct cap, or an

ill-defined zone. Three specimens measure as follows:—Length (A) 2.52 × 1.6 inches; (B) 2.52 × 1.77 inches; (C) 2.47 × 1.7 inches. The egg referred to by Mr. Savidge, taken from the former figured nest, *in situ*, and presented by him to the Trustees of the Australian Museum, is the most remarkable shaped Lyre-bird's egg I have seen, being almost as round and about the size of a tennis ball. It is of a pale purplish-grey ground colour, flecked, streaked, and blotched nearly uniformly all over, with darker shades of the ground colour, intermingled with a few markings of a greyish-brown hue. Length 2.22 × 1.96 inches.

Young birds, when about a fortnight old, are covered with down, smoky-brown above, including the head, pale-brown on the breast, passing into dull greyish-white on the centre of the abdomen; bare skin on the sides of the head, throat and neck dark leaden-grey; bill blackish; legs and feet leaden-grey with a fleshy shade; iris brown.

This bird breeds during the depth of winter. It usually commences to build late in May, or early in June, laying in July, and the young one leaves the nest about the end of September. While sitting the tail of the female is laid over the back. The male does not assist in the task of incubation.

Menura victoriae.

QUEEN VICTORIA'S LYRE-BIRD.

Menura victoriv, Gould, Proc. Zool. Soc., 1862, p. 23; *id.*, Handbk. Bds. Austr., Vol. I., p. 302 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 662 (1890); *id.* Handl. Bds., Vol. III., p. 3 (1901).

ADULT MALE—*Similar to that of MENURA SUPERBA, but may be distinguished by the white inner web of the outer tail-feather when held horizontally away from the light, and the broad notches of darker chestnut, which extend across it nearly to the shaft.*

ADULT FEMALE—*The webs of the outer tail-feather of the female are broader than in M. SUPERBA, and the chestnut notches on the inner web darker and more well defined.*

Distribution—South-eastern New South Wales, Eastern Victoria.

PRECISELY similar in habits, and closely allied to the preceding species, is QUEEN VICTORIA'S LYRE-BIRD. From Western Port, in Victoria, its range extends in a north-easterly direction across the border into South-eastern New South Wales. In Victoria it is abundantly dispersed throughout the humid mountain ranges of Gippsland, and nearer Melbourne is not uncommon in the Dandenong Ranges, Fernshaw, and the Black Spur.

I first met with this species in the Strzelecki Ranges, where for many years during my visits it was very common. It has now sadly diminished in numbers owing to the clearing and burning of the undergrowth, and the merciless warfare waged against both male and female by persons in the district. Through being constantly hunted whenever they commence to call, some of the males of this species get exceedingly shy and wary. One, I well remember, frequented the thick scrub in a steep and almost inaccessible part of a creek, a short distance from the house. It was evidently a wary old bird, for it successfully evaded the efforts of many a skilful hunter to secure it. I am pleased to add that it remained to enliven us with its song and wonderful powers of mimicry, until the surrounding scrub was cut. The females are always more easy to approach than the males. I have on several occasions known them to remain in a tree for a quarter of an hour at a time, their attention being rivetted to a small rough-haired terrier beneath, who was barking furiously and making frantic efforts to reach them. This terrier used also to go hunting Lyre-birds on his own account, and one could tell by the length of time he was barking whether he had flushed a male or female, as the male seldom remained more than a few seconds in a tree when disturbed, ere they sought refuge in flight. Previous to this species in

New South Wales being absolutely protected all the year round, I have seen men in the metropolis with baskets, containing fifty or more tails of the male birds, hawking them for sale in the streets. From inquiries made, they were principally obtained in the mountain ranges of the Snowy River district. Victorians more particularly at present will have to legislate so that the interesting bird dedicated to the late Queen Victoria does not become extinct, or at least a rarity in that State. Since the introduction of the Fox, that scourge and pest of every poultry yard, upwards of forty tails of this species has been found at Bayswater in a single lair or burrow of this acclimatised curse.

While searching for food among the fallen leaves, both this and the preceding species rest on the left foot, and use the right to throw or scrape the leaves behind them, alternately from right to left. I have had several opportunities of watching these birds in confinement at the Australian Museum, but have never observed them use the left foot to scratch with, or both feet like a domestic fowl. Young birds taken from the nest thrive very well, and soon get domesticated if allowed their freedom in a garden, provided it is in the district in which they are bred, for they do not as a rule long survive after removal to a different climate. They are, however, as mischievous and full of tricks as a monkey. I knew of a young male in South Gippsland that used to enter the men's hut, jump on the table, and throw about the knives, tin plates and pannikins. When driven out it would ascend on to the roof of a house they were engaged in erecting close at hand, and amuse itself by casting down hammers, chisels, nails, or any other small articles lying about.

Although Lyre-birds pass most of their time on the ground, in the evening I have seen them in secluded parts of the gullies make a zig-zag ascent from branch to branch, to the bushy tops of tall trees. The most melodious notes I ever heard from this species was poured forth by a male early one spring morning, from its roosting place in the top of a Blackwood tree growing on the edge of a creek. Throughout the day I have never seen them frequent trees unless disturbed, and then only the low undergrowth.

Mr. Joseph Gabriel, of Melbourne, who has a wide experience of these birds, has sent me the following notes:—"In my rambles through the numerous gullies of the Dandenong Ranges, I have observed *Menura victorie* in large numbers during the early years of my experience. The birds start very early to build their nests, sometimes in the first week in May, and take some time to complete their work, as I have found unlined nests as late as the first week in August. The majority of the birds lay in June and July. I have found a fresh egg as late as the 22nd September. The time taken in hatching the egg is still a vexed question; I should say about five or six weeks, as I have found the birds so frequently absent from their nests, the eggs being invariably cold. Unfortunately this is somewhat vague, and I have tried hard to obtain better results. The Olinda Creek, which passes through Lilydale, takes its source in these ranges. It has two main branches with many tributaries, and I have noticed that the eggs taken in the branch whose source is Mount Observatory, are quite fresh in the first week in August, those taken in the other branch four or five miles away only, are nearly all incubated. I do not know whether this gully is warmer, or whether it points to the fact that the birds are less frequently disturbed.

"I have found nests in all kinds of places, on rocks in centre of creeks, on leaning ferns, logs over creeks, butts of trees, sides of hills, in forks of trees sometimes forty to sixty feet up, tops of burnt out stumps, sometimes over thirty feet up, on banks facing a creek and here they look quite picturesque; on branches of musk trees, and also on crowns of ferns (*Dicksonia billiardieri*), here showing a remarkable instinct, as they must rear their young before the spring of the new fronds takes place, which of course destroys the nest. The birds invariably build the nest the same, dome-shaped with oval mouth at the side. It is composed of fine sticks, the inner portion of the fibrous roots of ferns (*D. billiardieri*), and just before laying its egg the bird lines the nest with a number

of feathers plucked from its breast. Sometimes the nest is ornamented with fronds of ferns, generally *Polypodium*, more especially when built low down on the ground. The position of the nest always allows a free flight for the bird, whether built on trees, banks or otherwise, generally facing down the creek if built there. The birds are not good flyers, and I have noticed that when they build high up on stumps or trees, there are always sapling growths of varying heights to assist them, as ladders, in their hopping flight to the nest. These high nests (of greater numbers in late years) are attributed to the ravages of Foxes. Nests are of varying sizes, according to position generally, about twenty-four inches across.

“During the breeding season is the best time to hear the cock bird piping his dulcet music, early morning and late afternoon being his favourite times for song, more especially if it has been raining the night before. You have to be very careful in approaching while the birds are in song. If they stop singing, you must be perfectly still, and only approach when they start again. By this means you will get comparatively close, and will be well rewarded for your patience. I have heard them mimic the glorious carol of the Magpie, the harsh note of the Black Cockatoo, the hiss and crack of the Coach-whip, the pretty warble of the Blue Wren, the whistle of the Rosella and shriek of Pennant's Parrakeet, the lovely notes and song of the Harmonious Thrush, the chop of the axe, and other noises, all and sundry of our beautiful bush. Early morning is also their principal feeding time, and their chief food during the breeding time is a small crustacean (*Talitrus sylvaticus*), which they scratch up in large numbers, and one sees the scratched ground in great evidence in passing along the sides of the hills and creek banks. On the hill sides also are found the dancing mounds, where the birds do their courting. The birds do not pair, but are polygamous. One of my friends saw this by watching, if two or more birds are flushed together, the hen or hens invariably fly on to a branch near by, while the cock disappears through the undergrowth; the hens seem to know they are not wanted. I am inclined to the belief that these birds were not so timid at one time as we find them now, and this may be surely traced to the advance of the selectors, &c., into the country in which they are found. In comparatively recent years it was a common occurrence in the Strzelecki Ranges to meet birds crossing one's track in fair numbers during the day, but this ground has been selected, and the birds not shot have been driven back, consequently they are now shy.

“There are generally one or two birds building in a friend's paddock, which is an ideal place for them, as they are almost unmolested, and while staying there it is very pleasant to be wakened every morning by the lovely notes of these birds. One of my friends, when quite a lad, found a nest with young close to the stable; the young one had been hurt in some way, and he used to take it out of the nest and pet it, the old bird meanwhile perched on a branch near by, not at all put about, but taking it as a matter of course. The young are very ungainly and leggy for some time after being hatched. I once flushed a bird off a nest and egg from which I had taken an egg the previous season. This is the only instance in which I have found a nest re-built. The birds about this spot invariably build on high stumps.

“In 1904, at Bayswater, my friends frequently noticed, while hoeing between the raspberry canes, a fine male bird busily engaged in picking up food from the newly dug soil, and not more than a dozen yards away. The large number of these beautiful birds which at one time existed in the Dandenong Ranges, have almost disappeared since the village selectors came on the scene. Nor do they appear in extra numbers in the Government Reserves. I believe they have simply been shot off. One of my friends and myself were examining a nest, off which the Lyre-bird had just flown, when my friend said look at the hen, and there she was not twenty feet from us; first she would scratch for a little, and then pretend to run, and she repeated the manoeuvre many times, each time gradually coming nearer. All this was evidently to try and lead us away from the nest, like many other species of our feathered friends. The locality was

in a rarely frequented gully in the Dandenong Ranges. Can we gather from this that the birds when unmolested are by no means so shy as they are usually said to be? On two occasions I have noticed the cocks crossing the track quite close to me."

Four eggs, selected to show how they vary in shape and size, measure as follows:—Length (A) 2.55 × 1.76 inches; (B) 2.33 × 1.62 inches; (C) 2.48 × 1.6 inches; (D), an abnormally elongated specimen, 2.73 × 1.64 inches.

The nests and eggs of Queen Victoria's Lyre-bird cannot be distinguished from those of the preceding species. It breeds during the coldest months of the year, commencing in May and continuing through the four following months. One of Mr. Gabriel's friends at Bayswater obtained an egg as early as the 10th June, 1902. I found eggs in July and August in the Strzelecki Ranges, and Mr. Gabriel records in his notes taking one as late as the 22nd September. Many years ago the most successful collector I knew of, Mr. Ernest Pakenham, while engaged at a survey camp, obtained near the Black Spur no less than six eggs of this species in one day. Frequently in South-eastern New South Wales, and sometimes in Victoria, the nests of this species are found crushed in with the weight of snow. In the former State the peaks of the mountain ranges it frequents are snow-capped all the year round.

Menura alberti.

PRINCE ALBERT'S LYRE-BIRD.

Menura alberti, Gould, Proc. Linn. Soc., 1850, p. 67; *id.*, Handbk. Bds. Austr., Vol. I., p. 307 (1865); *id.*, Bds. Austr., fol. Vol. Suppl., pl. 19 (1869); Sharpe, Cat. Bds. Brit. Mus., Vol. XIII., p. 662 (1890); *id.*, Hand-l. Bds., Vol. III., p. 3 (1901).

ADULT MALE—*Resembles the adult male of MENURA SUPERBA, but has the upper surface chestnut, which is richer on the rump and upper tail-coverts; the head and neck dark slaty-grey; throat chestnut; breast and abdomen ashy, washed with chestnut; tail black above, slaty-black beneath washed with chestnut, the exterior feather shortest and not lyriform in shape, and destitute of notches or markings on the inner web. Total length 32 inches, wing 10, outer tail feather 13, filamentous feathers in the centre 19, tarsus 4.4.*

ADULT FEMALE—*Similar in plumage to the male, but differs in having all the tail feathers broadly webbed.*

Distribution—North-eastern New South Wales, South-eastern Queensland.

PRINCE Albert's Lyre-bird is the smallest and least attractive species of the genus, but its comparative rarity, due to its extremely limited habitat, amply compensates for its loss of beauty. Its range is restricted to that belt of dense and luxuriant tropical vegetation lying between the Richmond River, in New South Wales, and almost the extreme south-eastern portion of Queensland. Thus, it will be seen, each part of South-eastern Australia is inhabited by a species of Lyre-bird peculiarly its own. The present species occupying the northern limit of their range, the common and oldest discovered Lyre-bird the intermediate region, and Queen Victoria's Lyre-bird the extreme south-eastern boundary.

One of the earliest procured specimens of Prince Albert's Lyre-bird was sent to London by the Trustees of the Australian Museum, at the request of their colleague, the late Dr. George Bennett, who took a great interest in the additions being made to the fauna of Australia. Mr. Gould, who described this species, was also indebted to Dr. Bennett and his friends for information relative to its habits. That its powers of mimicry, however, exceeds that of *M. superba*, has not

been confirmed by subsequent observers. Mr. Gould, in the "Proceedings of the Zoological Society of London," figures and describes a nest and egg of this species, but by some oversight the artist has represented two eggs in the nest instead of one, which is laid by this bird for a sitting. At the present time it is not uncommon in the dense brushes of the Tweed River. Formerly it used to be plentiful about Taranya Creek, a tributary of the Richmond River, and there is a fine series of these birds in the Australian Museum collection that were obtained in that locality. Mr. A. Meston informs me that the farthest north in Queensland that he has procured this species is Mount Tamborine and the head waters of the Coomera River, about forty miles south of Brisbane.

To give an account of its powers of mimicry, habits and food would only be to repeat what has been said of either of the preceding species of this genus.

A nest found during July, 1895, in the scrubs of the Tweed River, was built close to the ground in a buttress of a giant Fig-tree. It was a large dome-shaped structure, outwardly formed of sticks and twigs, dried ferns, mosses and black hair-like rootlets, the bottom of the nest inside being lined with the downy feathers of the *Menura*. This nest was partially concealed by debris, but the entrance was not sheltered in any way, the egg lying clearly exposed to view at the bottom of it. The egg is of a purplish-brown ground colour, indistinctly spotted with dull blackish-brown markings, which are confluent on the larger end, and there form a well-defined cap. Length 2.45×1.72 inches. Two eggs in Mr. George Savidge's collection, taken in the brushes of the Brunswick River, in North-eastern New South Wales, during July 1899, vary in shape and colour. One is oval in form, and of a pale vinous-brown ground colour with freckles, short streaks, and irregular-shaped markings of different shades of brown, which are larger and more numerous on the thicker end, where they form an irregular zone, and in some places confluent patches. Length 2.46×1.67 inches. The other is a short oval in form, and of a dull dark olive-brown ground colour, almost uniformly marked, except on the larger end, with dull indistinct blackish-brown irregular shaped spots and blotches, which are scarcely distinguishable from the ground colour. Length 2.35×1.72 inches.

Like the two preceding species the breeding season of Prince Albert's Lyre-bird is during the late autumn and winter months.

ORDER PICARIÆ.

Sub-order CORACIÆ.

Family CAPRIMULGIDÆ.

Genus CAPRIMULGUS, Horsfield.

Caprimulgus macrurus.

LARGE-TAILED NIGHTJAR.

Caprimulgus macrurus, Horsf., Trans. Linn. Soc., Vol. XIII., p. 142 (1821); Gould, Bds. Austr., fol. Vol. II., pl. 9 (1848); *id.*, Hand-bk. Bds. Austr., Vol. I., p. 100 (1865); Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 537 (1892); Sharpe, Hand-l. Bds., Vol. II., p. 87 (1900).

ADULT MALE—*General colour above brown, finely vermiculated with grey, the feathers down the centre of the head and nape conspicuously streaked with brownish-black; collar on the hind neck rufous, the feathers having blackish cross-bars; upper back rich brown; scapulars like the head, with a blackish-brown sub-apical marking or cross-bar, bordered on either side with buff, paler at the tip; lesser wing-coverts rich brown, some of the long outer ones with buffy-white tips; the median and greater coverts rich brown, vermiculated and conspicuously tipped with buff; quills brown, with the remains of broken rufous cross-bars, more numerous on the inner secondaries and largely decreasing in number towards the first primary, which has a white spot on the inner portion of the inner web, the second, third and fourth primaries with a large white patch on both webs, the inner primaries having indistinct brownish-grey freckles near the tip; tail blackish-brown, the central feathers irregularly and finely freckled with pale brown, the lateral ones having the remains of broken rufous cross-bars, the apical third of the two outer feathers on either side white tinged with brown on the margin of the outer web; lores, feathers around the eyes and the ear-coverts rich velvety-brown, slightly darker on the former; chin and sides of the throat rich brown with indistinct blackish cross-bars; a broad white band extends across the throat, the lower feathers tipped with black, followed by a line of blackish-brown feathers tipped with rich buff, some of them having the remains of indistinct blackish-brown cross-bars; chest dull grey, vermiculated with brown, some of the feathers in the centre having whitish tips, remainder of the under surface and under tail-coverts rich buff with dark-brown cross-bars; bill black; legs and feet reddish-brown; iris blackish-brown. Total length 11 inches, wing 7.5, tail 6, bill 0.4, tarsus 0.7.*

ADULT FEMALE—“*Differs from the adult male in having the outer web of the first primary spotted with rufous, in having pale rufous marks on the primaries instead of white ones, in the tips to the outer rectrices being less in extent and tinged with buff or rufous, speckled with brown on the tip of the outer web.*”*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland.

THE Large-tailed Nightjar has a wide range, extending from Northern Australia to Southern Asia. In the “*Catalogue of Birds in the British Museum*,” † Dr. E. Hartert remarks:—“*The typical form is found in Queensland and Northern Australia, many of the Papuan Islands, throughout the Malay Archipelago, in Cochin China, Siam, the Malay Peninsula and Tenasserim.*” This species is also found in Java, Malacca and the Aru Islands.

In Australia Dr. Hartert has recorded specimens from Quail Island, North-western Australia, the Alligator River in the Northern Territory, and Queensland. Mr. Edwin Ashby, of Adelaide, informs me that he has several specimens sent him from the Northern Territory of South Australia. All the specimens I have examined were obtained at Cairns and Cardwell. I have

* Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 538 (1892). † *Loc. cit.*, p. 538.

also received eggs from the Bloomfield River and Herbert River Districts, but it does not occur in Southern Queensland or in New South Wales. While collecting on behalf of the Trustees of the Australian Museum, Messrs. E. J. Cairn and Robert Grant procured specimens in the neighbourhood of Cairns, and the latter has kindly favoured me with the following notes:—“We found *Caprimulgus macrurus* in the forest country on the coast, also in the pockets on the mountains, and we secured all the specimens as we walked through the forest and flushed them from the ground. We first heard the call of the bird at night, near our camp at Boar Pocket; it resembles the sound ‘chop, chop,’ and can only be compared to some person cutting down a tree in the distance, and we tried to locate it, but without success. The following night, a clear moonlight one, I heard the cry come from the same direction, and as I approached the tree a bird flew and I fired, but I did not find it until next morning, when it was useless as a specimen, as it was then partly devoured by ants. Every fine night, but especially when moonlight, the ‘chop, chop’ call of this species could be heard, usually commencing just about dusk and continued at intervals for some length of time. The stomachs of the birds we shot principally contained moths and other insects.”

Mr. J. A. Boyd writes me on the 11th September, 1891:—“*Caprimulgus* has arrived for the breeding season;” and in a later communication, “the native name for this bird is ‘Tee-ok.’”

While resident at Ingham, on the Herbert River, North-eastern Queensland, Mr. A. F. Smith wrote me as follows:—“*Caprimulgus macrurus* seems plentiful judging by the ‘knocking’ heard at night, and especially on moonlight nights. I found four nesting sites on the ground, each with two eggs or two young ones. All were near the edge of light scrub, the eggs being deposited on fallen or dead leaves, which they resemble in colour. The young, in down, are also yellowish like the leaves.”

The Large-tailed Nightjar, or Goatsucker, bears a strong resemblance on the upper parts, when the outer tail-feathers are concealed, to the Spotted Nightjar (*Eurostopus argus*), but may be easily distinguished by its strong rictal bristles, which must greatly assist this species to capture its prey while on the wing. The members of the families Caprimulgidæ and Podargidæ, are remarkable for their noiseless flight and soft and downy plumage, which is principally moth-like in its markings, and extremely variable in colour.

The present species makes no nest, but the eggs, two in number for a sitting, are deposited on the bare ground or on fallen leaves in open forest lands, light scrub or clearings in the jungle. They are nearly true ellipses in form, the shell being close-grained, smooth and lustrous, and are of a pinkish-stone or a faint reddish-cream ground colour, with almost obsolete spots, blotches and fleecy clouded markings of various shades of faint purplish-brown and light slaty-grey. In some specimens the markings have so washed out an appearance, that they are barely distinguishable from the ground colour. A set of two taken by Mr. J. A. Boyd, at Kipple Creek, Herbert River, on the 19th September, 1894, measure:—Length (A) 1·18 × 0·85 inches; (B) 1·21 × 0·87 inches. Another set taken on the 14th November measure:—(A) 1·16 × 0·83 inches; (B) 1·18 × 0·84 inches.

Genus *EUROSTOPUS*, Gould.

Eurostopus albigularis.

WHITE-THROATED NIGHTJAR.

Caprimulgus albogularis, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 194 (1826).

Eurostopodus albogularis, Gould, Bds. Austr., fol. Vol. II., pl. 7 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 96 (1865); Sharpe, Handl. Bds., Vol. II., p. 80 (1900).

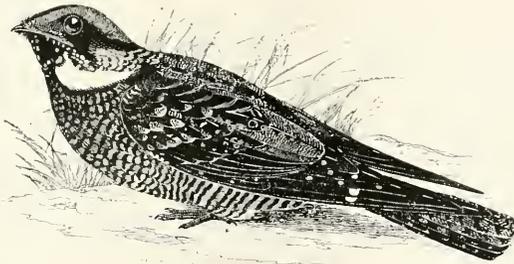
Eurostopus albigularis, Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 607 (1892).

ADULT MALE—General colour above dusky-grey, minutely freckled with black and rusty rufous; forehead and crown of the head grey, with fine black vermiculations on the sides, and large black streaks down the centre; a line of intermingled buff and black feathers extends from the gape around the hind neck, forming a collar; scapulars pale grey with fine black vermiculations and a broad black bar, chiefly on the outer web of each feather, and which have narrow pale rufous margins; quills blackish-brown, spotted with rusty-rufous, the third primary with a small, and the fourth primary with a large spot of white on their outer webs; central pair of tail-feathers dark brown, with irregular barrings of grey, vermiculated with black, remainder of the tail-feathers dark brown with bars of buff on their inner and indistinct markings of greyish-buff on their outer webs; throat blackish-brown, some of the feathers tipped with buff, on each side a conspicuous patch of white feathers; chest and breast dark brown, with indistinct grey and very pale buff barrings; abdomen and under tail-coverts dull rusty-rufous, barred with dark brown; bill blackish-brown; legs and feet reddish-brown; iris dark brown, nearly black. Total length in the flesh 13 inches, wing 10, tail 6.5, exposed portion of bill 0.25, tarsus 0.8.

ADULT FEMALE—The sexes are alike in plumage, but in some adult specimens examined the white spots on the outer webs on the third and fourth primaries are absent.

Distribution—Northern Territory of South Australia, Queensland, New South Wales, Victoria.

THE White-throated Nightjar is widely distributed over the eastern portion of the Australian Continent; it is rarer, however, in Southern Australia, and does not occur in Central



WHITE-THROATED NIGHTJAR.

Australia. In Queensland and New South Wales it is not uncommon in the coastal brushes and open forest lands, but is seldom seen except just about dusk, when it ventures forth to secure its food, as it passes most of its time asleep in some sheltered spot during the day. During March, 1893, it was particularly numerous around Sydney, and many were observed hawking around the fig-trees in the Domain. It appeared at this time in

great numbers in the orchards on the Lane Cove River, and was the subject of various letters contributed to the daily papers, several correspondents pointing out how useful it was in capturing large moths and beetles. The mouth, when distended, is very capacious, enabling it to swallow many insects entire. Its nocturnal habits have gained for it in many parts of Australia the misleading local names of "Night Hawk" and "Moth Hawk."

Stomachs of these birds examined contained the remains of more or less perfect moths and night-flying beetles; one shot at Narrabeen had a perfect specimen of the green beetle (*Schizognathus prasinus*): others were crammed with Bagong Moths (*Agrotis spina*), the caterpillar of which is so destructive to grass.

Dr. A. M. Morgan writes me from Adelaide:—"Eurostopus is a rare bird in this part of the country. I have never seen a live bird, and have only seen a few feathers, which were sent me for identification, but I could not tell to what species they belonged. I have never heard of the egg of either *E. albigularis* or *E. argus* being taken in South Australia proper."

Mr. Edwin Ashby sent me a specimen for examination from the Northern Territory of South Australia, in which the white spots on the outer webs of the third and fourth primaries

are absent, and similar to an example from Campbelltown, New South Wales, marked a female. Other specimens in the Australian Museum collection, marked females, are undistinguishable from the male. Subsequently Mr. Asbby sent me the following note :—" I skinned a female specimen of *Eurostopus albigularis* from Cowra Creek, near Bredbo, New South Wales, in which the white spots on the primaries are absent."

The White-throated Nightjar makes no nest, but deposits a single egg on the bare ground, or on fallen dead leaves, sometimes on the side of a gravelly ridge, or near a log or stump. At all times the egg is difficult to discover, as it assimilates so closely to its environment. The female sits very close, trusting to escape observation by crouching down and remaining quiet, sometimes permitting herself to be almost trodden upon. Mr. George Savidge, of Copmanhurst, on the Clarence River, has been more successful than any one I know of in finding the eggs of this species. He forwarded me the accompanying photograph of an egg he found lying on some dead Eucalyptus leaves, with which were intermingled some scales of bark, on the 12th December,



NESTING-PLACE AND EGG OF THE WHITE THROATED NIGHTJAR.

1890, and sent the following note :—" Do you know that *Eurostopus albigularis* perches on trees at times? The bird belonging to this nesting place and egg flew round several times, and then came back and settled on a thin dead and nearly upright branch of a tree close by. It remained there for a long time, until I hunted it off." At various times I have received some very fine specimens from the late Mr. George Barnard, and his son Mr. H. G. Barnard, taken by them at Coomboolaroo, on the Dawson River, Queensland. An egg was taken, from which the bird was flushed at some distance away, by Mr. C. G. Johnston, on stony ground near the head of Middle Harbour, on the 15th December, 1897. Another was found by his brother, Mr. A. A. Johnston, at Lindfield on the 8th November, 1898. The sitting bird was flushed, and together with its mate perched on a tree close at hand, uttering all the time, and when flying around him, harsh notes of distress, resembling the alarm notes of *Halcyon sanctus*.

The egg is elliptical in form, some specimens being rather pointed at each end, the shell being close-grained, smooth and slightly lustrous. Typically they are of a rich cream ground

colour, sparingly spotted and blotched with rounded black markings, and underlying ones of bluish-grey, predominating usually towards one end: others have the markings in clusters, or confined to one side of the shell; one now before me has minute dots, rounded oval, and larger heart-shaped spots of black, intermingled with underlying markings of slaty-black, and a line of spots which bears a close resemblance to the Belt of Orion. Length 1·62 × 1·14 inches. An unusually marked specimen, taken by Mr. Charles French, the Victorian Government Entomologist, in Gippsland, on the 20th January, 1895, has nine large irregular-shaped umber-brown smeary blotches, and a few spots on a cream ground colour. Length 1·57 × 1·12 inches. An egg taken at Manly has the ground colour of a faint yellowish-green, approaching in tint the egg of *Eurostopus argus*.

This species is usually a late breeder, eggs being found generally in November, December and January, but Mr. G. Savidge sends me a note of taking an egg at Copmanhurst, New South Wales on the 28th September, 1896, from which he flushed the bird, as his earliest record of the laying of this species.

Eurostopus argus.

SPOTTED NIGHTJAR.

Eurostopodus guttatus, (nec Vig. and Horsf.), Gould, Bds. Austr., fol. Vol. II., pl. 8 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 98 (1865).

Eurostopus argus, Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 608 (1892).

ADULT MALE—*Resembles the adult male of EUROSTOPUS ALBIGULARIS, but is distinguished by its smaller size and more rusty-rufous and lighter grey colour of the upper parts; the latter colour is very pronounced on the central tail-feathers, the remainder being darker and more thickly barred with grey and rufous; the first primary with a round white spot on the inner portion of the inner web, the second, third and fourth primaries with a larger white spot on both webs; on the under parts the white patches of feathers on each side of the throat meet in the centre and form an inverted V-shaped marking, the feathers on the fore neck are tipped with rufous, and the vent and under tail-coverts are uniform rusty-rufous; bill dark brown; legs and feet reddish-brown; iris rich dark brown*" (Bennett). Total length 11·5 inches, wing 8·8, tail 6·3, exposed portion of bill 0·25, tarsus 0·7.

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, Aru Islands.

THE Spotted Nightjar, in addition to its smaller size and more rusty-rufous markings of the upper parts, may be easily distinguished from the preceding species by the larger white spots on the primaries, and by the complete inverted V-shaped white marking on the throat. I have examined specimens from all the Australian States, except Victoria and South Australia, and there are examples in the Australian Museum collection obtained by Mr. George Masters at Port Denison, Queensland, in June 1864; also, at King George's Sound, Western Australia, in April, 1869. The late Mr. T. H. Bowyer-Bower obtained specimens at Derby, North-western Australia, to which Dr. E. P. Ramsay referred as follows in the "Proceedings of the Linnean Society of New South Wales" *:—"The specimens here under consideration belong to some of the numerous varieties of *Eurostopodus guttatus*, Vigors and Horsfield. The predominant colouring of the upper surface, especially on the wings and their coverts, is of a rich rufous; the under surface also is highly coloured with the same tint; front and centre of the head richly mottled with rufous and black; under tail-coverts light rufous, the tail below with from nineteen to twenty alternate bars of black and rufous, the upper surface of the tail-feathers freckled and

* Proc. Linn. Soc. N. S. Wales, Vol. I., 2nd ser., p. 1097 (1887).

barred with ashy-grey and rufous, also barred with black, all the feathers being distinctly margined and tipped with rufous. In a second specimen the rufous markings are not so prominent, the large white wing spot is confined to the first four primaries, inner primaries with a rufous tip. Length $11\frac{1}{2}$ inches, wing 8.4, tail 6.4."

In colour these birds vary as much as does *Podargus strigoides*; one bird in the collection obtained by Mr. G. Masters at Port Darwin has the prevailing hues, light ashy-grey, sandy-rufous and brownish-black.

Mr. G. A. Keartland met with this species in great numbers, while a member of the Calvert Exploring Expedition in Western and North-western Australia; he has also forwarded me its eggs taken by Mr. Field at Alice Springs, and by Mr. C. E. Cowle at Illamurta, in Central Australia. From Mr. H. G. Barnard I have also received the eggs of this species, taken by him at Daringa, Dawson River, Queensland. Gould remarks that he "killed it in South Australia and New South Wales."

In the "Catalogue of Birds in the British Museum," * Dr. Ernst Hartert points out that the type specimen of the Nightjar described by Messrs. Vigors and Horsfield in the "Transactions of the Linnean Society of London," † in 1826, under the name of *Caprimulgus guttatus*, which is in the British Museum, is only the young of *Eurostopus albigularis*, and uses Rosenberg's specific name of *argus*, applied in 1867 to specimens from the Aru Islands. Further evidence, if necessary, showing that Dr. Hartert was correct in doing so, is given by Vigors and Horsfield in the notes following their description. † "Mr. Caley informs us that the bird was picked up dead on his premises, in its present imperfect state, and was supposed to have been killed by a cat." Caley lived at Parramatta, fifteen miles from Sydney, where *Eurostopus albigularis* is fairly common, and *E. argus* does not occur. Although *E. argus* is apparently numerous in Western New South Wales, judging by the following notes of the late Mr. K. H. Bennett, I have never seen a specimen in the flesh from any part of the State, and there is only a single example in the Australian Museum collection procured in New South Wales. The specimen referred to was obtained by the late Mr. K. H. Bennett, at Moolah, who wrote:—" *Eurostopus guttatus*, although plentiful in the back or timbered country, is rarely met with during the day, and always on the ground, but as twilight comes on, should there be any tank or waterhole in the vicinity these numbers of them will be found, as they come there regularly every evening to drink. This they do by skimming rapidly over the surface of the water and scooping it up with wide open mouths, while darting about with rapid zig-zag flight. They remain but a short time at the water, and having satisfied their thirst skim rapidly off in quest of nocturnal insects, which constitutes their food."

While resident at Point Cloates, North-western Australia, Mr. Tom Carter sent me the following notes:—" *Eurostopus argus* is a resident species, and is fairly common about the ranges. During the drought of 1889-91 they were generally seen flitting about the camp fires at night. The natives are very superstitious about this bird, and pretend to believe that it steals babies at night time."

Like the preceding species the Spotted Nightjar makes no nest, but deposits its egg on the bare ground, frequently on the side of a stony ridge. The egg is elliptical or a rounded oval in form, the shell being close-grained, smooth and slightly lustrous. They are usually of a yellowish-green, or a greenish-white slightly tinged with olive ground colour, sparingly marked with rounded spots and blotches of purplish-brown or brownish-black. An egg in the South Australian Museum, Adelaide, taken by Dr. E. C. Stirling at Lake Eyre, in September 1899, is marked with purplish-black, one of them being a very large blotch. An egg taken by Mr. H. G. Barnard, at Daringa, on the 16th October, 1892, measures—Length 1.4 × 0.98 inches. Another taken

* Vol. XVI., p. 607 (1892). † Vol. XV., p. 193 (1826).

by Mr. C. E. Cowle, at Illamurta, in Central Australia, in April 1897, measures 1.31 × 1.03 inches. Mr. Cowle writes me:—"The Spotted Nightjar (*Eurostopus guttatus*) lays at the foot of a Hop-bush, as a rule on dead leaves. I note Mr. Keartland says one egg, but I have found two in a nesting place on the ground."

In Queensland, Western New South Wales, South Australia, and Central Australia the breeding season is usually in September and the three following months, but in Central Australia it sometimes lays after heavy rains, early in March and April.

Family PODARGIDÆ.

Sub-family PODARGINÆ.

Genus PODARGUS, Vieillot.

Podargus strigoides.

TAWNY-SHOULDERED PODARGUS.

Caprimulgus strigoides, Lath., Ind. Orn., Suppl. II., p. 262. (1801).

Podargus strigoides, Gould, Handb. Bds. Austr., Vol. I., p. 84 (1865); Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 631 (1892); Sharpe, Handl. Bds., Vol. II., p. 42 (1900).

Podargus humeralis, Gould, Bds. Austr., fol. Vol. II., pl. 3 (1848).

Podargus curvieri, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 200 (1826).

ADULT MALE—*General colour above dull greyish-white vermiculated with dark brown, all the feathers mesially streaked with blackish-brown, and having a small white tip, which is more conspicuous on the crown of the head; tail like the back, but having irregular broken cross bars of blackish-brown; the wing-coverts slightly rufous, the shoulder tawny in some, the outer series with an indistinct whitish spot, vermiculated with light rufous-brown; quills blackish-brown, with irregular white bars on the outer web; all the under surface greyish-white, the feathers finely mottled with greyish-brown, those on the lower breast, abdomen and flanks freckled with pale brown, and mesially streaked with blackish-brown; bill blackish horn colour; legs and feet pale mealy-brown; iris yellow. Total length in the flesh 19 inches, wing 11.2, tail 9.2, bill 1.4, tarsus 1.5.*

ADULT FEMALE—*Similar in plumage to the male, but slightly smaller, Wing 10.8 inches.*

Distribution—Southern Queensland, New South Wales, Victoria, South Australia, Tasmania.

LIKE the family Caprimulgidæ, the family Podargidæ is subject to considerable variation in plumage, and the latter attains its zenith in the various forms of the present species, *Podargus strigoides*. Latham states it inhabits New South Wales, and in his description remarks, "the general colour of the plumage is rusty-brown above."

Dr. R. B. Sharpe remarks in his recently published volume, "The History of the Collections contained in the Natural History Departments of the British Museum," "up to the present time it has never been known where Latham obtained the material for describing so many Australian, or as they were then called, 'New Holland' birds.

"In 1902 the Museum acquired from Mr. James Lee, a grandson of the famous horticulturist of Hammersmith, a large volume of paintings executed for the latter by one of his collectors, Thomas Watling, between 1788 and 1792. These drawings had evidently been shown to Latham, who named most of the birds, and seems to have referred to those pictures 'as Mr. Lambert's Drawings.' They do not seem, however, to have been Lambert's property at any time. The types of Latham's species are, in fact, founded on these drawings of Watling's.

* Hist. Coll. Brit. Mus. Bds., p. 107 (1906).

"The collector was sent to New South Wales by Mr. Lee, and some of the illustrations of White's 'Journal of a Voyage to New South Wales in 1790,' were drawn by Watling. . . .

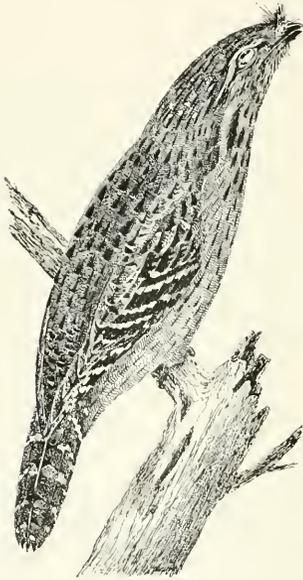
Latham determined the drawings, and they bear his handwriting. He also copied many of Watling's original notes, "but he says not one word about Watling or James Lee in the text of his book (General Synopsis of Birds), nor can I so far find any evidence of his giving credit to either of them as the source of his information."

"The newly acquired volume contains several views of Sydney, which are of great interest."

Dr. Sharpe then enumerates the list of drawings, and quotes Watling's original remarks and notes upon them. It covers forty-six pages and is brimful of interest, not only to Australian ornithologists, but to anyone concerned in the early settlement of New South Wales, from the time of the arrival of the First Fleet in 1788, and the five succeeding years.

By the publication of "The History of the Collections contained in the Natural History Departments of the British Museum; Birds," Dr. Sharpe has rendered inestimable service to ornithologists all over the world, and the account of how the great Zoological Collection of the British Museum was first founded and worked up to its present unrivalled position, will be read by all zoologists with great interest.

Many of Watling's drawings, now in the British Museum, form the types of species of a number of Australian birds, and among them is included *Podargus strigoides*. What has so often puzzled me on referring to many of Latham's original descriptions of Australian birds in his "General Synopsis of Birds" and "Index Ornithologicus," such as size "uncertain," is now cleared up, for they were taken from Watling's drawings.



TAWNY-SHOULDERED PODARGUS.

In a large series of these birds from Eastern Australia, the most common type procured in the neighbourhood of Sydney is of the dark grey form, and seldom is one seen with as much rufous on it as is shown in Gould's figure of this species in his "Birds of Australia," under the name of *Podargus humeralis*, and Gould's vernacular name of "Tawny-shouldered" Podargus is not applicable to most of the specimens I have examined. An example from Kingsford, obtained by Dr. E. P. Ramsay, approaches in colour more nearly Gould's figure. This specimen has the lores, ear-coverts and tips of the feathers on the sides of the fore neck rufous; in others these parts are brown. Some specimens are very much lighter than others, and have large, rounded, white eye-like spots on the greater wing-coverts. The most rufous bird in the collection is an adult female obtained by Mr. Robert Grant on the Belling River; especially is this more pronounced on the tail feathers, which are distinctly barred with pale rufous and black; it has also larger white tips to the feathers on the crown of the head. Wing 10·2 inches. An adult female obtained by Mr. George Savidge, at Copmanhurst, on the Clarence River, is only slightly more rufous than Sydney examples. An adult male, labelled *Podargus cuvieri*, procured by Mr. George Masters at the Ouse River, Tasmania, in March 1867, is indistinguishable from specimens of *P. strigoides*, obtained near Sydney. Wing 10·8 inches. An adult male obtained by Mr. Masters on

the 9th October, 1864, and an adult female procured three days later in the same locality, have the upper parts more distinctly spotted with white, especially the male, which also has a few of the apical portions of the feathers on the upper parts with broad irregular-shaped white cross-bars. Wing of male 10·7 inches; of female 10·5 inches. Mr. R. N. Atkinson forwarded an adult male and female, procured in September, 1908, at Penguin, in North-western Tasmania. The male is similar to those previously described, but the female may be easily distinguished by the decided rufous wash to the feathers, but which is far more pronounced on the upper parts. The wing-measurement of both is alike, 9·75 inches. Notwithstanding all these variations I have pointed out from the preceding description, I believe it is possible for one to obtain specimens which do not agree with any of them.

The vernacular name of "Frogmouth," sometimes applied to this genus of birds, has been since 1877 in use for a group of birds found in India and some parts of the Malay Archipelago, and was Jerdon's rendering in his "Birds of India" of Gould's genus, *Batrachostomus*. Both in Australia and Tasmania *Podargus strigoides* is more familiarly known under the name, erroneously applied, of "Mo-poke" and "More-pork." As pointed out by me in 1890,^{*} the bird which utters the peculiar note resembling these words is the Boobook Owl. Dr. Sharpe referring to *Ninox boobook* remarks † "Watling's note is . . . , 'Native name Boo-book,'" and to *Podargus strigoides* ‡ under Latham's synonym of *P. gracilis*, "Watling says the native name is Poo-book." Undoubtedly these names, so closely resembling each other, were intended by the natives to apply to a single species, that of *Ninox boobook*, and the confusion that existed so long as to the notes of *Podargus strigoides*, was probably due to Watling's mistake in applying to the latter the native name of "Poo-book."

Open forest lands and clearings are chiefly resorted to by this species, situations favourable for procuring its food. Slow and lethargic in habits, for it is usually observed in the daytime perching in some thick fork of a tree, or on a thick bough, it is by no means so sleepy as it appears, for Gould states it is strictly nocturnal. These birds are fairly common around Sydney. One I tried to capture by placing a noose over its head, while sitting in a low thick fork of a gum-tree, allowed me to remain for some time close to it, but that it was fully aware of my intention I detected by observing the slightest movement of one of its eyes through the almost closed lids. The whole attitude and appearance of the bird, when on the alert, and perched in this situation, with long drawn-out neck and body, uplifted head, and tightly compressed feathers, strongly resembles the head and fore part of the body of the Lace Lizard (*Varanus varius*); when perched on a thin limb exposing the tail feathers the likeness is not so apparent, and it more closely approaches in form a dead branch. They are not easily disturbed, even when sticks are thrown at them, but when flushed several times I have known them to take flight on one approaching the tree in which they had taken refuge. They are most harmless and inoffensive creatures, and never did I feel so guilty of bird murder as when I shot one, the only one I ever fired at, and solely to ascertain its food.

At Roseville on the 30th August, 1908, I saw a pair of these birds in a thick stemmed sapling; one bird, asleep, was sitting in a forked limb with the feathers almost standing at right angles to the body, and the head hardly visible, the whole aspect of the bird resembling a puff ball with a long tail, its mate almost touching it and perched parallel along a limb. The feathers of the latter were tightly compressed, and the body and head long drawn out, giving the bird that lizard-like appearance previously referred to, and was no doubt, as has been suggested by Dr. Macgillivray, only assumed on the approach of danger. This is the only instance in my experience that I have observed this species perched parallel along a limb.

* Guide to the Contents of the Australian Museum, Birds, p. 58 (1890).

† Hist. Coll. Brit. Mus. Bds., p. 113 (1906). ‡ Loc. cit., p. 145 (1906)

Stomachs examined contained the remains of frogs, crickets, spiders and the heads and wing-cases of large beetles.

I have frequently stood on bright moonlight nights at Roseville and Chatswood, underneath these birds perched and calling within a few feet of my head. I have also heard their notes uttered many times throughout the day, and from the sounds, which may be heard some distance away, traced it after some trouble, as this species undoubtedly possesses ventriloquial powers, to one or more of these birds sitting on a thick bough, generally of a gum-tree. During a twenty years experience, however, in localities where these birds are tolerably common, I have never heard them emit any other note except that resembling "oom, oom, oom," repeated from ten to fifteen times in succession, and uttered as if with tightly closed lips.

From Glanmire, near Bathurst, Mr. Alfred E. Ivatt writes me :—" Do you know anything of the sound made by *Podargus strigoides*, somewhat resembling "um" sounded with the mouth closed, and in a low note, repeated twelve or fifteen times? I have heard it on several occasions, but never identified it with the bird until this season. Also as to the food of *P. strigoides*, which I believe Gould states to consist of insects caught on the bark and branches of trees. I have seen two or three feeding, and they appear to feed, and to sit and watch for their food, in a similar manner to the Laughing Jackass, *i.e.*, sitting on a dead branch or the top of a fence post not far from the ground quite motionless, and then flying down and up again after a short interval. Of course it is too dark to see the actual food taken."

Mr. Thos. P. Austin, of Cobborah Station, Cobbara, New South Wales, writes me as follows :—" One morning while riding beneath an Apple tree (*Angophora lanceolata*) I saw a *Podargus strigoides* sitting upon a nest about twenty feet from the ground. Upon climbing the tree I discovered a second bird perched upon a neighbouring bough, not more than three feet from the nest. The nest contained two eggs, which I did not interfere with, but when passing the tree about six hours later, neither bird was upon the nest, nor could I see them in the tree, so I again climbed to the nest, and much to my surprise there was nothing in it. When I reached the ground I hunted for the broken eggs, but could see no signs of them, so presume the birds thought it wise to move them elsewhere. While on a visit to Mackay, North-eastern Queensland, during the first week of November, 1907, I saw a nest of these birds with two half fledged young; when passing the nest again the following day, both young birds had disappeared."

While resident at Hamilton, in South-western Victoria, Dr. W. Macgillivray kindly favoured me with the following interesting notes :—" *Podargus strigoides* is common throughout the district. This bird finds its living much in the same way that the Brown Flycatcher does, by sitting on a fence post, exposed limb of a tree, stump or other point of vantage, sallying forth at intervals to capture any insect venturing within range of its vision, and returning to its perch. I kept two of these birds for several months in my garden at Coleraine, and they proved amusing and instructive pets. This bird's note is often uttered during the daylight, it takes the form of a low hoot repeated twenty or more times in succession, commencing in a low key and rather slowly, and becoming quicker and higher pitched towards the end. With regard to the attitude assumed by this bird for the sake of protection, that is of sitting in the long axis of a limb, with head extended in a line with the body, eyes nearly closed and feathers closely folded, my observations lead me to believe that it is only assumed on the approach of danger, and is not an habitual or restful one; when undisturbed, and when sleeping, they sit as any other bird would; their hearing must be very acute, as on anyone approaching within thirty or forty yards the protective attitude is assumed, and the intruder watched through half closed eyelids; when their attitude and coloration is found to be no longer of any use, safety is sought in flight; when this is impossible, as it was with my pets, who had their wings cut, or in a state of nature when caught, they have recourse to another expedient, that is to convert themselves into as fearsome objects

as possible, the head and neck are extended on a level with the feet with all feathers erect, eyes and mouth widely opened, wings stretched out, and tail feathers expanded and elevated, a succession of hoarse grunts being uttered at the same time."

The nest is a nearly flat structure, formed of twigs thicker below, finer above, the slight depression in the centre sometimes being lined with Eucalyptus leaves. They vary in size and form, some being more scanty than others, and of an average diameter of nine inches and a depth of three inches; while nests may be found eight inches in length by five inches in breadth. They are usually placed on a horizontal fork, or at the junction of a thick and nearly upright forked trunk of a tree, at a height varying from ten to thirty feet or more from the ground. The bird at all times sits very close, and the male assists in the task of incubation. While resident at Bellerive, near Hobart, Tasmania, Dr. L. Holden forwarded me a photograph of a nest and two eggs under the name of *Podargus cuvieri*, found by him on the 23rd November, 1899, and wrote me:—"The 'Morepork,' as she sits three-quarters on to the observer, strikingly resembles the drawing of the True Griffin in the third volume of 'Modern Painters.'"



NEST AND YOUNG OF TAWNY-SHOULDERED PODARGUS.

The eggs are two or three in number, more often have I found the latter for a sitting, elongate or elliptical oval in form, the shell being almost close-grained in some, finely granulate in others, pure white and the surface slightly lustrous. A set of two taken at Roseville on the 3rd September, 1907, measure:—Length (A) 1.87 × 1.33 inches; (B) 1.81 × 1.32 inches. A set of three taken at Belmore on the 9th November, 1905, measures:—Length (A) 1.75 × 1.22 inches; (B) 1.73 × 1.23 inches; (C) 1.73 × 1.24 inches. An unusually small set measures:—Length (A) 1.62 × 1.15 inches; (B) 1.6 × 1.12 inches.

Mr. Leslie Oakes informs me that he once found a nest of *Podargus strigoides*, containing eggs, built inside an old mud nest of *Corcorax melanorhamphus*.

The young, when first hatched, are clothed in pure white down, and have the eyes unopened. Mr. R. Lennard presented a nest and three live recently hatched young to the Trustees of the

Australian Museum, which he took at Greendale, near Manly, on the 14th October, 1901. They are now mounted in the Group Collection.

Nestlings have the feathers of the upper parts dull white, centrally streaked or barred with blackish-brown, wings and tail brown vermiculated with pale brown, all the under surface covered with dull whitish-brown down, with here and there a dull white feather mesially streaked with blackish-brown. Wing 5 inches.

August and the four following months constitutes the usual breeding season of this species.

Podargus brachypterus.

SHORT-WINGED PODARGUS.

Podargus brachypterus, Gould, Proc. Zool. Soc., 1846, p. 163; *id.*, Handbk. Bds. Austr., Vol. 1, p. 89 (1865).

ADULT MALE—*Similar to the adult male of* PODARGUS STRIGOIDES, *but smaller and darker rufous on the upper wing-coverts. Total length 14.5 inches, wing 9.1, tail 7.5, bill 1, tarsus 1.1.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—Western Australia, South Australia, Central Australia.

GOULD'S *Podargus brachypterus* is a distinctly smaller form of *P. strigoides*, and not of *P. phalanoides*, to which Dr. Hartert in the "Catalogue of Birds in the British Museum" states that it seems to belong. Of the adult females in the Australian Museum collection one is most pronouncedly rufous, and except for the different barrings on the tail, and its smaller size, is almost indistinguishable from the specimen of *P. strigoides* obtained by Mr. Robert Grant on the Bellinger River. An adult female, shot from the nest by Mr. C. E. Cowle, at Illamurra, Central Australia, is similar in colour to some of the grey forms of *P. strigoides*, and has a slight rufous wash. Wing 8.7 inches. Another somewhat similar specimen in the collection, sex not recorded, and procured by Mr. George Masters at Port Lincoln, South Australia, has the wing-measurement 9.4 inches. Probably specimens obtained from further east and north would be found to be intermediate in size, until they reached in wing-measurement the typical *P. strigoides*.

Probably referable to this form are the notes made by Dr. A. M. Morgan, on a trip to the north-west of Port Augusta, South Australia, in August 1900:—" *Podargus strigoides*, a common bird, only the light-coloured phase seen. Two nests were found on the 8th August, at Arcoona, one hundred and forty miles north-west of Port Augusta. One was in a pine tree, about eight feet from the ground, and contained three slightly incubated eggs; the other nest had two slightly incubated eggs, and was on the thick branch of a myall. On the 11th August, at Yeltacowie Creek, another nest was found with two eggs; and on the 12th August, at Mt. Gunson, in a black oak, a new bulky nest was found in course of construction." Also the following notes received from Dr. W. Macgillivray:—" *Podargus phalanoides*: Mr. J. M. Newman, a friend of mine, manager of the Peak Hill Mine, Peak Hill, Western Australia, who collected with me here for a couple of seasons, and who occasionally sends me notes from his present district, wrote me under date 11 1 07 about a bird which I think must be the above species. 'I had a peculiar experience with a Grey Owl. Our donkey driver saw her sitting on a bough, and brought his whip over her; she dropped, and he left her for dead, but finding she had been sitting on a few twigs like a pigeon's nest, looked and found two eggs. These he brought to me; they were nearly hatched. Coming the same road two weeks later, he saw presumably the same owl sitting on the same nest. He lifted her off and found two more eggs, which he brought me. I blew them; they were quite fresh. A week or two later he found her again sitting, but

a Crow or some other bird had partly eaten the two eggs. Judge of my astonishment when, in another week or two, he brought me two more from the same bird's nest."

Mr. Tom Carter writes me from Broome Hill, South-western Australia:—"I take *Podargus strigoides* to be the species I have observed from the North-west Cape to Broome Hill, in various localities, including Kellerberin, which is about one hundred and fifty miles east of Fremantle. The skins from the north-west are more rufous than those from the south-west, but the character of the markings seems to be the same. When found in broad daylight, sleeping in the dense foliage of some saplings or scrub, they can be caught by hand if approached quietly. In the north-west they appear to breed after rain, irrespective of season. Eggs were noted there on 30th October, 1900, 16th July, 1901, 7th February, 1902, and a fledgling on 4th December, 1900. I have a skin of a fledgling procured at Broome Hill, on 11th November, 1906. It is mostly of a light grey colour, much lighter than any of my adult skins. When at Point Cloates, a man engaged in sinking a well for me, shot a Frogmouth one night as it perched on the windlass, as it frequently did. On dissection I found it to be crammed with large centipedes, which made the slayer regret having shot a bird so useful at a camp. The male bird assists at incubation. The nest is a very frail looking structure, and the eggs are always two in number. The sitting bird will assume an upright position on the nest, with its beak pointing upwards, causing it to much resemble the broken stump of a side branch."

Mr. G. A. Keartland forwarded me a skin, nest and eggs procured by Mr. C. E. Cowle at Illamurta, Central Australia, in 1903. The nest is a nearly flat structure, formed of short, thin sticks and twigs, loosely interlaced together, averaging seven inches across by two and a half inches in depth, and was built in a Mulga eight feet from the ground.

The eggs, two in number, are pure white, elliptical oval in form, the shell being close-grained and slightly lustrous. They measure:—Length (A) 1.58 × 1.1 inches; (B) 1.52 × 1.09 inches.

Podargus papuensis.

PLUMED PODARGUS.

Podargus papuensis, Quoy et Gaim., Voy. de l'Astrol., Ois. pl. 13 (1830); Gould, Handbk. Bds. Austr., Vol. I., p. 91 (1865); *id.*, Suppl. Bds. Austr., pl. 7 (1869); Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 630 (1892); Sharpe, Hand-l. Bds., Vol. II., p. 42 (1900).

ADULT MALE—General colour above white, thickly mottled all over with grey, brown and black, the apical portion of the feathers with fewer mottlings, especially on the scapulars and greater wing-coverts, where they form bands along the wing, the lesser and median coverts rufous-brown, the tips white, mottled with rufous brown, and forming a less distinct line; tail feathers resemble the back, but have alternate greyish-white and brown bands separated by a broken black transverse line; above the eye a white stripe, which is more distinct on the anterior portion; all the under surface white mottled with brown, all the feathers having narrow black shaft lines and three or more blackish-brown wavy transverse lines, forming large white blotches on both webs; "bill brownish-grey; legs and feet brownish-grey" (Olive). Total length 21 inches, wing 12, tail 11, bill 1.5, tarsus 1.2.

ADULT FEMALE—Resembles the male in character of markings, but is smaller and rufous-brown above, the under surface paler, the chin, throat and fore neck almost uniform in colour and devoid of white blotches on the feathers. Wing 10.6 inches.

Distribution—North-eastern Queensland, Southern New Guinea.

IN Australia the Plumed Podargus inhabits the North-eastern portion of Queensland. Specimens from Cape York have the feathers on the upper parts more broadly centred with blackish-brown than examples obtained near Cooktown by Mr. E. A. C. Olive. I have never seen a specimen of Gould's *Podargus plumiferus*, which he states is a "native of the brushes of

the Clarence and neighbouring rivers in New South Wales," from any part of the latter State. Gould's figure of *P. plumiferus*, in his folio edition of the "Birds of Australia," is, however, identical with the preceding description of the female obtained by Mr. Olive near Cooktown, and which has the throat and fore neck unspotted. Although I have not seen a female of *P. papuensis* from New Guinea, I do not think the slight difference in colour would warrant the separation of *P. plumiferus* from the former species. I look upon it in the same light as one finds a variation in the plumage of *P. strigoides*. With the above described specimens, Mr. Olive forwarded the stomach of one in spirits, which contained only some vegetable fibre; also two nests and two eggs, together with the following notes:—"Both of these nests of the Papuan Podargus, from which the birds were shot, were taken from large tea-trees about thirty feet from the ground. They also build on the large branches of trees; they select a branch running at right angles from the trunk, where there is a slight depression or hollow, and place a few twigs in it. When on the nest they do not sit like other birds, but lie on the nest parallel with the branch, and are consequently very difficult to detect. When not nesting, and in the day time, they select a tree with thick leaves; three or four are generally found together sitting with the head and beak pointing skyward, and it is easy to approach within a few feet of them, if care is taken to avoid noise. I frequently see them in the mangrove bushes on the banks of the Annan River. One egg I send you was heavily incubated, the other quite fresh, and from the partly formed egg I secured when dissecting the body, I conclude some of them lay two eggs, but as a general rule they lay only one.

"These birds make a sound like 'Woo-woo-woo,' repeated quickly about a dozen times, then make a snapping sound once or twice repeated (I conclude by opening the mouth and closing it smartly). Other sounds are attributed to them, viz., a low booming, and a cry like 'waugh, waugh,' repeated slowly several times, but I have not been able to verify these two latter."

The nests sent are small, irregularly-shaped and nearly flat structures, formed of thick twigs, and are in each instance built in the three-pronged fork of a tea-tree. One, from which the male was shot on the 7th September, 1907, averages eight inches in diameter by four inches in depth. The other, on which the female was sitting, taken on the 11th October, 1907, measures only six inches in length, four inches in breadth, and two inches and a half in depth. Each contained a single egg.

The eggs vary in shape; one is a nearly true ellipse, the other a compressed ellipse, pure white, the shell being close-grained and smooth, and one specimen slightly glossy, and measure respectively 1.93 × 1.32 inches and 2.15 × 1.32 inches.

August and the four following months constitute the usual breeding season of this species in the Cooktown, Bloomfield River, and Cairns Districts of North-eastern Queensland.

Sub-family ÆGOTHELINÆ.

Genus ÆGOTHELES, *Vigors and Horsfield.*

Ægotheles novæ-hollandiæ.

OWLET NIGHTJAR.

Caprimulgus novæ-hollandiæ, Lath., Ind. Orn., Vol. II., p. 588 (1790).

Ægotheles novæ-hollandiæ, Gould, Bds. Austr., fol. Vol. II., pl. 1 (1848); *id.*, Hand-bk. Bds. Austr., Vol. I., p. 79 (1865); Hartert, Cat. Bds. Brit. Mus., Vol. XVI., p. 651 (1892); Sharpe, Hand-l. Bds., Vol. II., p. 44 (1900); Hartert, Nov. Zool., Vol. XII., p. 216 (1905).

ADULT MALE—*General colour above snuky-grey, with numerous transverse bars of greyish-white, which are broader and more regular on the tail-feathers; upper wing-coverts like the back; quills*

dusky-grey, the innermost secondaries barred on both webs with greyish-white; the remainder less distinctly marked, and on their outer webs only, except the first primary, which is notched and toothed with pale buff on the outer web; head greyish-white, with narrow blackish transverse bars; an irregular band joins a crescent extending from the nape forward over the eyes, and another crescent lower down towards the hind neck smoky-black; a collar on the hind neck greyish-white tinged with rufous, and having narrow transverse blackish bars; feathers around the eye blackish; ear-coverts greyish-white, with narrow transverse blackish bars, except at the base; all the under surface greyish-white, irregularly barred with blackish-grey; centre of the abdomen, vent and under tail-coverts white; bill blackish-brown; base of the under mandible fleshy-white; legs and feet flesh colour or fleshy-brown; iris blackish-brown. Total length in the flesh 9 inches, wing 5, tail 4.75, exposed portion of bill 0.2, tarsus 0.87.

ADULT FEMALE—Similar in plumage to the male.

Distribution—Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia, Tasmania.

LATHAM described the Owllet Nightjar in his "Index Ornithologicus," under the name of *Caprimulgus nova-hollandia*, and there referring it to the Crested Goatsucker of Phillips' "Voyage to Botany Bay," in 1790, and later on figured and described it in his "General Synopsis of Birds" under the name of the "Banded Goatsucker," and where he remarks:—"Inhabits New South Wales, where it is called by the English Musquito Hawk, a name, it must be remarked, the Goatsucker of North America is known by; most frequent in July."

The above description is taken from a New South Wales specimen, and I have before me a series from all parts of the continent. There is the usual variation found in the plumage of this species, even in specimens obtained in the same locality. Examples procured by the late Mr. Alexander Morton, at Port Essington, from which locality Gould described the type of *Egotheles leucogaster*, are indistinguishable from specimens obtained by Mr. Robert Hislop at the Bloomfield River, and by Mr. George Masters at Gayndah, Queensland. They are slightly browner on the upper parts, and have the ear-coverts strongly washed with rufous, but not so much as is exhibited in an unlocalised specimen from Victoria, which in addition has the collar on the hind neck rufous, also the feathers of the head, throat and breast washed with rufous. So far as the supposed distinguishing character of the white breast is concerned, it is not more apparent in the specimens from North Australia than in some examples procured at Middle Harbour and Hunter's Hill, near Sydney, and at Mongup, Salt River, Western Australia; the latter also belonging to the smoky-grey form of typical birds obtained around Sydney. In the "Catalogue of Birds in the British Museum," Dr. E. Hartert unites *Egotheles leucogaster* with the older described species *E. nova-hollandia*. Writing subsequently in "Novitates Zoologicae," * he says:—"I am now of opinion, from what I have recently seen, that it is after all possible that two forms, a more southern and eastern, which I should call the true *nova-hollandia*, and a more northern and western one, which would be *leucogaster* of Gould, can be distinguished."

In the neighbourhood of Sydney this species is not uncommon, but it usually passes the day in some hollow limb of a tree, from which it may be dislodged by striking the trunk with a stick or stone. If disturbed, it only flies a short distance and takes refuge in some hollow branch. A specimen presented by the Rev. J. Moran, of Hunter's Hill, to the Trustees of the Australian Museum, was brought into the house by a cat. It is a bird, however, unless disturbed, more often heard than seen. While living at Dobroyde, Ashfield, I have often, when walking in the bush with the late Mr. K. H. Bennett, and especially on moonlight nights, listened to its peculiar "churring" notes.

* Vol. XII, p. 216 (1905).

Stomachs, which are thick and muscular, of specimens examined contained only the remains of insects, and although obtained in widely separated localities, all were alike, heads, legs, thorax and wing-cases of various species of small black beetles.

Mr. G. A. Keartland sends me the following notes :—“ I have found *Egothales nova-hollandiæ* near Melbourne and in almost every place I have visited between that city and the Fitzroy River, North-western Australia. Its variation in colour is almost as extensive as its range. One bird I shot at Clayton, Victoria, had a perfectly white breast and steel-grey head and back, whilst another seen on Brookman Creek, in North-western Australia, was as black as soot. The majority of these birds, however, are dark grey with a brownish tinge on the upper parts. While lying under a verandah near the junction of the Fitzroy and Margaret Rivers, North-western Australia, I saw many of these Nightjars flying under the roof, or skimming past like Swallows, in pursuit of insects. Occasionally birds of a rufous-cinnamon colour are found near the Fitzroy River, but whether they are referable to a new species or not requires further investigation.”

Dr. A. M. Morgan has kindly forwarded me the following notes :—“ *Egothales nova-hollandiæ* was formerly a fairly common bird in the neighbourhood of Adelaide, but I have not seen one now for many years. I found it nesting at the Finnis about eight years ago in the hollow log of a brush fence, and I have several times disturbed the birds from hollows in the scrub there, when tapping the trunk to see what would come out. They were also evenly distributed at Laura, but I did not find them nesting there. At Mount Gunson they were very common, and rather shy, as they almost invariably left their hollow before I got to the tree, and sometimes I have had four or five of them flying in front of me down the bed of a gum creek which I was working. I found two nests in the Mount Gunson district; the first in a hollow myall, about four feet from the ground, containing two young birds and an egg just chipped by the chick; the old bird was very reluctant to leave the nest, she puffed out her feathers and opened her beak, making a faint hissing noise; finally I had to forcibly remove her. The chicks were covered with a thick white down, and the eyes were not open; they were very active, and ran over and under the old bird like mice. The nest was made of the broad-leaved mulga and the leaves of a shrub locally known as “wattle-bush.” The second nest was made in the hollow of a gum stump in Yeltacowie Creek, and contained three heavily incubated eggs; the opening of the hollow was twelve feet from the ground, and the nest was formed of similar materials as the last. Forty yards away I found a nesting-place of the Elegant Grass Parrakeet (*Euphema elegans*) containing five eggs of that species and a sterile egg of *Egothales nova-hollandiæ*. I did not see an example of the latter in the Gawler Ranges.”

From Broome Hill, in South-western Australia, Mr. Tom Carter writes as follows :—“ *Egothales nova-hollandiæ* occurs sparingly in crevices of the cliffs at the North-west Cape, and in hollow gum spouts inland. It appears to be rather plentiful in the hollows of trees about Broome Hill, but difficult to procure. I constantly hear their querulous complaining note in the daytime, but have only once seen one in daylight, when it had its head protruding from a hollow spout, evidently extremely indignant at a pair of *Glossopsittacus porphyrocephalus* which, being busy hunting for a nesting site, had disturbed the occupant.”

From Copmanhurst, on the Upper Clarence River, New South Wales, Mr. George Savidge writes :—“ *Egothales nova-hollandiæ* is common here; frequently these birds would come out of a hollow limb on a wet day and call at intervals. The eggs, three in number for a sitting, are deposited in a hollow branch, and usually on a layer of opossum fur.”

From Cobborah Station, Cobbara, New South Wales, Mr. Thos. P. Austin writes me as follows :—“ This nocturnal species (*Egothales nova-hollandiæ*) appears to be fairly plentiful throughout this district. Some of these birds are very easily disturbed from their roosting or hiding hollows, but others cannot be persuaded to leave their home unless the very bough in which they are is hit with a stick or something of that sort. I have often seen them fly

from hollow boughs while passing beneath with flocks of sheep. Their nest is usually placed in a hollow spout, generally in an upright one, but they are not particular as to the depth of the hollow. I have seen their nests within a few feet of the entrance; others as much as twelve feet down. In the Geelong District, Victoria, I took eggs from the same hollow three years in succession. This nest was placed in a Red Gum, about forty feet from the ground. I once found a nest placed in a hole drilled into a bank of the Talbragar River, New South Wales."

From South-western New South Wales, Dr. W. Macgillivray writes me as follows:—"*Egotheles nova-hollandiæ* is very common along all the creeks about Broken Hill; hardly a night can be passed in the open without its "chur-churring" note being heard from amongst the trees. It is frequently flushed from the hollows in gums, in which during the spring months it constructs its little nest of small dry gum or mulga leaves. The chief nesting months are September and October, although a few nests may be found in the latter part of August if the season be an early one, but I only noted this take place in 1905. By November all young birds have left the nests. A full clutch of eggs is four, although one often finds three. They are pure white in most instances, although some have brownish streaks, spots or irregular markings on them, mostly at the larger end, where they sometimes form a ring. One clutch which I have has every egg marked very distinctly; other clutches have only one or two eggs showing the markings, and sometimes these are very faint. The birds are easily flushed from their hollows, the little round head appearing at the opening when one is only approaching the tree, unless the bird happens to be sitting on eggs in an advanced stage of incubation, or very young birds, when she may often be caught on the nest. These birds live easily in captivity, and make interesting pets."

Through Mr. E. H. Lane I have received the following notes made by his nephew, Mr. Leslie Oakes:—"Re the Owllet Nightjar:—What we called the 'Small Owl' nested to my knowledge in Newington College Chapel, on the Parramatta River, in the years 1878 and 1879. School was held in the Chapel, and the bird was first noticed sitting in the partly open trap-door in the ceiling. It used to sit there hour after hour quite motionless. Of course some of the boys were soon up there after the nest, which was found in the corner formed where a ceiling-joint joined the wall plate, near the end of the building. As far as I remember there was no made nest, but I am inclined to think some rubbish was under the eggs. I got three eggs about a fortnight after another boy had taken three, that was in 1878, and the nest was taken in the same place in 1879. There was a large ventilator in the end of the Chapel, above the ceiling, and I expect the birds went in and out of it when going to and leaving the nest."

Dr. Lonsdale Holden informs me that he obtained this species at Circular Head, Tasmania, in a thick tea-tree scrub in March, 1892, and found a specimen in a man's hut near Mornington, Bellerive, on the 24th August, 1897. This bird was seen to come out of a hole in a tree, during the previous month, and was chased and subsequently killed by a Butcher-bird ("*Cracticus cinereus*").

The usual nesting place is in a hole in a tree, frequently in the remaining portion of a broken-off hollow branch, or trunk of a tree, varying in height from four or five feet to thirty feet from the ground. The eggs are generally placed on a layer of dead leaves, and sometimes fur, the latter probably the old nesting place of a Tree-creeper.

The eggs are usually three or four in number for a sitting, pure white, varying from elliptical to oval in form, the shell being hard, close-grained and slightly lustrous. When emptied of their contents, and several eggs are moved together while held in the palm of the hand, they produce a sound as if they were made of porcelain, and similar to that produced by the eggs of Eyton's Tree Duck when rubbed together. A set of four measure:—Length (A) 1·13 × 0·87 inches; (B) 1·12 × 0·87 inches; (C) 1·18 × 0·88 inches; (D) 1·14 × 0·85 inches.

Young birds resemble the adults, but are much darker in colour, the barrings less distinct, and have no trace of the light collar on the hind neck. Wing 4·3 inches.

September and the four following months constitute the usual breeding season of the species.

Family CORACIIDÆ.

Sub-family CORACIINÆ.

Genus EURYSTOMUS, Vieillot.

Eurystomus pacificus.

DOLLAR-BIRD.

Coracias pacifica, Lath., Ind. Orn., Suppl., p. xxvii. (1801).

Eurystomus australis, Gould, Bds. Austr., fol. Vol. II., pl. 17 (1848); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 36 (1892); *id.*, Handl. Bds., Vol. II., p. 47 (1900).

Eurystomus pacificus, Gould, Handbk. Bds. Austr., Vol. I., p. 119 (1865).

ADULT MALE—Head, hind neck and mantle brown, passing into dull bluish-grey on the scapulars, back, rump and upper tail-coverts: tail greenish-blue at the base, black at the tip, the middle of the outer webs of the lateral feathers washed with rich deep blue; upper wing-coverts greenish-blue; quills black, their outer webs rich blue, narrowly edged with greenish-blue, the primaries crossed in the centre with a pale greenish-white band; lores and feathers below the eye blackish; cheeks and ear-coverts brown washed with blue, except on the apical portion of the latter; throat deep blue, each feather with a central streak of light blue; sides of the neck and chest brown washed with greenish-blue; remainder of the under surface and under tail-coverts greenish-blue; bill rich red, blackish at the tip of the upper mandible; inside of mouth yellow; legs and feet coral-red; iris very dark brown. Total length in the flesh 10·8 inches, wing 7·7 tail 4, bill 0·92, tarsus 0·65.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria.



DOLLAR-BIRD.

THE acquisition of Watling's drawings of Australian Birds, by the Trustees of the British Museum, has enabled Dr. R. Bowdler Sharpe, in his interesting volume "History of the Collections, Birds,"* to finally settle the question of priority of names bestowed on the Pacific Roller, or better known "Dollar-bird." In referring to Watling's drawing of the present species, Dr. Sharpe remarks:—"This drawing is the type of *Eurystomus pacificus*, which name definitely takes precedence over the name of *australis* of Swainson. In the 'Catalogue of Birds' I was not certain as to the identity of *Coracias pacifica* of Latham, owing doubtless to the description having been taken from a drawing."

The late Mr. T. H. Bowyer-Bower and Mr. E. J. Cairn obtained specimens in 1886 near Derby, in North-western Australia. Mr. G. A. Keartland procured a single specimen only near the Fitzroy River, in

* Hist. Coll. Brit. Mus. Bds., p. 120 (1906).

January 1897, as the birds were then all in the moult. Dr. Ernst Hartert has also recorded it from Derby in "Novitates Zoologicae;"* also from Eureka and the South Alligator River, in the Northern Territory of South Australia.

The times of arrival of the Roller, or Dollar-bird, to the eastern portions of the Australian Continent, are almost the same as those of the Bee-eater. In North-western Australia and Cape York it is found throughout the early winter months. On the Herbert River it arrives from the north at the latter end of September or early in October, and remains to breed. It is a visitant to Central Queensland in the latter month, and to the northern parts of New South Wales at precisely the same time as it is observed on the Herbert River, the latter end of September or beginning of October. In some seasons it is earlier, for on one occasion I saw some young birds that were taken from a nesting place in the hollow bough of a Eucalyptus, near Newcastle, on the 2nd of October, 1892. In the southern parts of New South Wales, and in Victoria, it is a comparatively rare species. The journey northwards is made from New South Wales at the end of February or March, according to the season. Unlike the Bee-eater, the Australian Roller is more freely distributed throughout the coastal districts than it is inland. I met with it in November, 1896, breeding in open forest country on the western side of the Nundewar Range, and it is a regular visitor to the neighbourhood of Sydney, and is generally met with in scattered pairs here and there, but is nowhere common. It is a brilliantly plumaged bird, and the round white spot on each wing is very conspicuous during flight. In thinly timbered districts it is generally shy and wary, resorting to the topmost dead limbs of high trees, and only ventures near an intruder when its eggs or young are menaced by danger. The note of the Roller or Dollar-bird is peculiarly harsh and discordant, and is uttered chiefly while on the wing, and is usually more noisy shortly after sunset. Its food consists entirely of insects of various kinds. These birds are not usually gregarious, but Mr. Boyd once witnessed a number of them hawking for insects in company with *Chetura caudacuta*. Mr. R. Etheridge, the Curator, also informs me that towards the latter end of 1908 over fifty Dollar-birds were congregated on the dead limbs of the trees surrounding his house at Colo Vale, New South Wales, but in a few days they had gradually dispersed about the bush.

Mr. Frank Hislop sends me the following note:—"In the Bloomfield River District, North-eastern Queensland, *Eurystomus pacificus* is usually seen in the forest lands. As a rule they lay their eggs in a lofty hollow limb of a tree, but I saw one pair of birds nesting in a Termites mound on a tree, which had been previously used by a pair of Laughing Jackasses."

While resident at Ripple Creek, Herbert River, Queensland, Mr. J. A. Boyd sent me the following interesting note:—" *Eurystomus pacificus* arrives here usually in the latter half of September. On the 1st December, 1892, I got an aboriginal to climb for a Roller's nest, and got four fresh eggs." Writing on the 25th November, 1897, Mr. Boyd remarks:—"You cannot trust the blacks a bit. About a fortnight ago, when I was laid up, one brought me five eggs, which he insisted were those of *Dacelo leachi*; he was quite positive they were not Roller's. As they were heavily incubated I put them in a pannikin and left them in my room, and a few days afterwards two Rollers hatched out." Mr. Boyd also sent me the following notes on some of the migratory species visiting Ripple Creek, Herbert River:—"As a rule *Calornis metallica* first arrives here about the beginning of August, *Scythrops nove-hollandie* and *Eurystomus pacificus* a few weeks after; all leave again as soon as the first snap of cold weather comes on, generally about the beginning of May. Writing on the 7th May, 1894, Mr. Boyd remarks:—"A few *Calornis* and *Eurystomus* still remain; and again on the 24th, "The Weavers and Rollers that were here when I last wrote have left; both overstayed their usual time." On the 11th January, 1893, he writes:—"You asked me some time ago about the arrival and departure of *Scythrops nove-hollandie*. Last year I heard the first on the 26th September, and several were flying about

* Nov. Zool., Vol. XII., p. 214 (1905)

to-day, 20th February, 1895. I saw to-day two *Scythrops* and two *Calornis*, and Torres Strait Pigeons are still with us. 25th July, 1895, *Merops* still here on their southern flight; they return in the beginning of the year in the wet season, and are locally known as 'Rain-birds.'

From Duaringa, on the Dawson River, Queensland, Mr. H. G. Barnard sends me the following notes:—" *Eurystomus australis* appears here in October from the north, and at once pair, then select a suitable hole in a gum-tree, in the vicinity of which they remain for about a month, frequently flying in and out of the hole; nothing, however, is done in the way of preparing a nest, the eggs, four in number, being laid on the decaying wood or soft earth a foot or eighteen inches from the entrance. Their food consists principally of large Cicadæ, of which great numbers are about during the breeding time of these birds: they leave here and go north in February."

From Copmanhurst, on the Upper Clarence River, Mr. George Savidge writes me:—" *Eurystomus pacificus* usually arrives in this district about the latter end of September, and departs again after breeding about the end of February or March. It lays at the end of October, in November and December, and nearly always four eggs in number for a sitting, but during dry seasons, all the nests obtained contained only three eggs in each. A pair, as you know, breed in a tree close to my house, but as soon as the young are able to leave the nesting place, the old birds leave with them for a more retired part. The old birds search for food when they have young until it is quite dark. The young birds make a peculiar screeching angry noise." Mr. Savidge, on the 8th October, 1896, wrote as follows:—" Migratory birds are late this season. The Roller I heard for the first time yesterday, October 7th; they usually come the second week in September. The Pallid Cuckoo was the earliest of all, July 11th. Flinder's Cuckoo has only just arrived."

Mr. Thos. P. Austin sends me the following notes from Cobborah Station, Cobbara, New South Wales:—" *Eurystomus australis* arrives here in the early part of October and they invariably resort to the same favoured localities year after year, but do not always choose the same hollow for nesting, in fact I have never noticed them nesting a second time in the same hole. In the breeding season they are bold, fearless birds, although I have never been attacked while robbing their nests. I have watched them fighting an Iguana (*Varanus varius*); eventually the birds won the fight by knocking the Iguana off the tree; this reptile was rather a small one, otherwise I am afraid the bold birds would have lost the contents of their nest. As a rule these birds slip off their nests and fly away when approached, but I have known them refuse to depart even when a rifle bullet has been fired into the entrance of the hollow, and the bird was sitting only two feet within. This bird did not come out until the climber was just about to look into the hollow."

Mr. Robert Grant, Taxidermist of the Australian Museum, has given me the following notes:—" In North-eastern Queensland I found *Eurystomus pacificus* principally in the forest country, on the tablelands near Herberton; and in New South Wales on the Belling River and at Narromine and Lithgow, and usually in large timber in the neighbourhood of rivers and creeks. They breed in holes in trees. In December, 1907, my brother Mr. Richard Grant found a nesting place in a hole in a tree at Cox's River, Blue Mountains, only twelve feet from the ground; it contained two young ones. The stomachs of the birds I have shot contained principally beetles and other insects."

Mr. G. A. Kearthland writes me from Melbourne:—" *Eurystomus pacificus* is generally found in North-western Australia, along the course of rivers, where it perches on the highest dead branches of trees. Occasionally it will dart off after some passing insect, upon the capture of which the bird returns to its perch, while its mate takes the next turn. I have several times found the Dollar-bird near Melbourne, and one was sent in from Bairnsdale, Gippsland, for identification."

Mr. Edwin Ashby, of Adelaide, writes me as follows:—"I met with *Eurystomus pacificus* in the Blackall Ranges, about seventy miles north of Brisbane, Queensland. The bird used the bare branches of the tallest gum trees as a sort of lookout, and from that point of vantage hawked after insects. Specimens I have received from Port Keats, in the Northern Territory of South Australia, are smaller than examples from Southern Queensland."

It breeds in hollow spouts or holes in trees, depositing its eggs upon the rotten wood or dust usually found in these cavities. Mr. Frank Hislop also records it breeding in a hole in a White Ants' nest. As a rule their nesting places are rather difficult to discover, chiefly on account of the height they are from the ground, and the bird sitting very close. In the Upper Clarence River district, where the birds are common, Mr. George Savidge used to find them by firing a bullet into the limb just below the supposed nesting site, and thus disturbing the birds when sitting. At Ourimbah and Roseville I have seen the same nesting site resorted to season after season. In the latter locality the timber is rapidly being cut down, and the ground utilized for the erection of houses. I have never seen a nesting place of the Dollar-bird lower than forty feet from the ground, and have frequently observed them at an altitude of eighty, and sometimes over one hundred feet.

The eggs are usually four, sometimes only three, rarely five in number for a sitting, rounded-oval or oval in form, pure white, the shell being smooth, close-grained and as a rule lustrous. In a set of four now before me, taken by Mr. H. G. Barnard at Duaringa, Dawson River, Queensland, on the 22nd November, 1890, one egg of the set is entirely lustreless. They measure as follows:—Length (A) 1.37 × 1.15 inches; (B) 1.39 × 1.12 inches; (C) 1.3 × 1.11 inches; (D) 1.34 × 1.12 inches. A set of four taken by Mr. George Savidge, at Copmanhurst, Upper Clarence River, New South Wales, in November 1901, measure:—Length (A) 1.46 × 1.15 inches; (B) 1.4 × 1.16 inches; (C) 1.44 × 1.16 inches; (D) 1.35 × 1.14 inches.

Young birds resemble the adults, but are much duller in colour, and are destitute of the conspicuous deep blue patch on the throat, this part being brown, washed with pale greenish-blue. Wing 6.9 inches.

In New South Wales October and the three following months constitute the usual breeding season, but on the 19th October, 1892, M. Octave Le Bon brought for my inspection to the Australian Museum two young birds, apparently about four weeks old, taken two days previously from a nesting place in a hollow spout of a large dead gum-tree near Newcastle.

Family MEROPIDÆ.

Genus MEROPS, *Linnaeus*.

Merops ornatus.

BEE-EATER.

Merops ornatus, Lath., Ind. Orn., Suppl., p. xxxv., (1801); Gould, Bds. Austr., fol. Vol. II., pl. 16 (1848); *id.*, Handbk. Bds. Austr., Vol. I., p. 117 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 74 (1892); *id.*, Hand-l. Bds., Vol. II., p. 74 (1900).

ADULT MALE.—Above golden-green; lower back and rump cobalt-blue; upper tail-coverts blue; tail black, the two centre feathers washed with greenish-blue, the remainder narrowly edged with greenish-blue, except the outer feather on either side, which has the entire outer web green; upper wing-coverts like the back; quills orange-rufous washed with golden-green and tipped with black, the inner secondaries blue; back of the head and nape orange-rufous; lores, a line of feathers below the eye and the ear-coverts black, bounded underneath by a streak of cobalt-blue; chin and fore part of the cheeks yellow, passing into deep orange-rufous on the throat; lower throat black; remainder of the

under surface golden-green, the abdomen washed with blue; under tail-coverts blue; bill black; legs and feet dark mealy-grey; iris red. Total length in the flesh, 9.5 inches, wing 4.5, outer tail feathers 3.2, central tail feathers 4.5, bill 1.25, tarsus 0.4.

ADULT FEMALE—Slightly duller in colour than the male, and the two central tail feathers are shorter.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Western Australia.

THESE may be richer and more strikingly contrasted plumage in the different species of Rifle-birds and the Regent Bower-bird, but I know of no other bird in Australia which shows to such advantage on the wing as the Bee-eater. When seen for the first time, its rainbow-hued tints, coupled with its graceful and occasionally somewhat erratic flight, and shrill whirring note, cannot but fail to impress even the most casual observer.



BEE-EATER.

With the exception of Central Australia, this species has been recorded from nearly every portion of the continent; it likewise occurs in New Guinea and New Britain, Duke of York Island, the Moluccas and Celebes.

It is represented in the Australian Museum Collection by numerous specimens collected from different parts of Australia, and among others by Mr. Kendal Broadbent at Port Augusta, South Australia, Mr. George Masters at Flinders' Range, South Australia, and Mongup, Western Australia, the late Mr. Alexander Morton at Port Essington, Mr. E. H. Saunders at Roeburne, and by Mr. E. J. Cairn at Derby, North-western Australia: also by the latter

when in company with Mr. Robt. Grant in the Bellenden Ker Range and at Bourke, New South Wales. Although a strictly migratory species, individual variations occur, principally in the wing measurement, and in the length of the attenuated and small spatulate-tipped central tail feathers. In colour the most remarkable specimen in the collection is an adult male procured by Mr. E. H. Saunders, at Roeburne, North-western Australia, on the 29th April, 1889, of which the general colour of the plumage above and below is of a warm shade of golden-green.

At Cape York it may be met with in March and April, on the Herbert River in June, flocks continuing to pass south until the end of July. In New South Wales it usually arrives in October, in some seasons at the latter end of September, and in Victoria a few weeks later. The return journey from New South Wales is generally made in February, sometimes in March, arriving on the Herbert River, in Queensland, in March during the wet season, and where they are locally known as "Rain-birds." At Cape York, Mr. K. Broadbent remarks:—" *Merops ornatus* arrived here from the south on the 14th February. . . . Captain F. Dyer informs me that he has met with *Merops* at sea, between Mulgrave Island and the coast of New Guinea, in such numbers

as to cover the yards and deck of his ship." Many probably leave Australia for New Guinea, but it must be only for a very short period. Large numbers, however, are found at all times of the year in one part of Australia or another.

Messrs. E. J. Cairn and Robt. Grant while collecting on behalf of the Trustees of the Australian Museum at Bourke, on the Darling River, in Western New South Wales, in November 1889, procured a large number of skins of this species, and Mr. Grant has favoured me with the following notes :—"We found *Merops ornatus* in hundreds along the banks of the Darling River. They were nesting in the upper parts of the banks, not far below the level of the surface of the ground, in what seemed to have been decayed root holes. The birds were mostly perched on dead twigs, darting out now and again to capture some passing insect, and generally returning to the same branch before eating it. At Glenariff Station, near Byrock, I have found them nesting in holes in the plains, but never far from water. A few pairs nest every year at Cox's River, near Lithgow, on the Blue Mountains. When we were collecting in the Bellenden Ker Range, in North-eastern Queensland, in October 1887, one morning at Boar Pocket, about 7 a.m., we were surprised to find a large dead tree literally covered all over its branches with birds of this species. There must have been nearly five hundred, and apparently they had travelled a long distance, for they were resting low down on the limbs. Occasionally one would stretch its wings, or fly away for a few yards and then return to the same place. About 1 p.m. the entire flock rose into the air, when we fired and three or four dropped to the ground; the remainder flew away in a southerly direction."

In New South Wales this species is generally found inland, and seldom occurs near the coast, although it usually breeds every season on the upper parts of the Hawkesbury and Nepean Rivers. I have met with it also on the Namoi, Gwydir and Castlereagh Rivers in October and November, and where specimens were procured. It frequents chiefly open forest lands, the timbered banks of rivers and creeks, and open dry sandy patches adjacent to thick scrubs.

Although vernacularly called a Bee-eater, in common with other members of the genus, bees form, so far as my experience goes with *Merops ornatus*, proportionately only a very small portion of its food. In fact, so far as I have observed, the bird is too wary, and usually shuns the haunts of man, and although Dr. W. Macgillivray informs me that he has seen it in gardens in Broken Hill, I have never yet observed it in close proximity to, or perched on trees above bee-hives, as I have on many occasions the Dusky Wood Swallow (*Artamus tenebrosus*). In Australia it is undoubtedly the different species of Wood Swallows that prey to an enormous extent on these industrious insects, and are the true scourge of apiarists.

The food of the Bee-eater is usually obtained while on the wing, sallying forth from its favourite perch, the end of a bare dead limb of a tree, and returning again to the same place to eat it. Stomachs examined contained the remains of insects, principally beetles, wasps, flies, but seldom bees.

Writing from Mossgiel, New South Wales, the late Mr. K. H. Bennett remarks :—" *Merops ornatus* is a very common bird here during the summer months, arriving usually in October, and only on very rare occasions as early as September. It breeds here freely in the sand hills, and lays five or six eggs."

Dr. W. Macgillivray writes me from Broken Hill, in South-western New South Wales, as follows :—" *Merops australis* I first noted here 27th October, 1901, and odd birds after that until January, when they became quite numerous, and were frequently to be seen in the gardens in Broken Hill, and continued so till about the end of February. They are usually seen here during the spring and summer months when passing south or north. I know of no breeding place near here. Writing of the birds of the Cloncurry District, Northern Queensland, Dr. Macgillivray

remarks.—“*Merops ornatus* is numerous at all seasons, and breeds in October and November. It seems to feed principally on the white butterfly of the processional caterpillar.”

Mr. G. A. Keartland sends me the following notes from Melbourne:—“Although *Merops ornatus* is a regular visitor to the northern portions of Victoria, it seldom approaches the vicinity of Melbourne. In November 1897, however, several were seen at Melton and Bayswater. Generally this species is met with in pairs, one usually perched, while its mate flies around in search of insects. It was very common near the junction of the Fitzroy and Margaret Rivers, North-western Australia, in January 1897.”

From Adelaide Dr. A. M. Morgan sends me the following notes:—“*Merops ornatus* is a common visitor to the southern parts of South Australia; they arrive about August and leave for the north again in February. I have noticed that on their return journey the young birds go in flocks apart from the old ones. At Laura I found plenty of nests in November, 1895, the first noted on the 2nd and the last on the 25th November: all contained fresh eggs varying from two to five in number, the former probably incomplete sets. The breeding holes were between two and three feet long, and terminated in a chamber large enough for the bird to turn round in without injuring the long tail feathers; these holes were all drilled in a sandy bank. At the Finnis I came across these birds breeding in the scrub, the holes being dug in the flat, sandy and easily excavated soil. One I dug out was about three feet long, descending in a slanting direction to the egg chamber, which was about two feet beneath the surface. Some of these birds breed much later than I have found them. On the 23rd December, 1907, I received a note from Mr. Morphett, Wood’s Point, Murray River, informing me that he had just taken a set of eggs from a hole about fifteen inches deep in a bank.”

Mr. Edwin Ashby writes me from Blackwood, South Australia:—“A few years ago *Merops ornatus* used to nest annually in the side of a cutting at Happy Valley, a few miles south of Adelaide, but I am afraid that they have left that locality. They make their long nesting burrows in ‘creek cut outs,’ near Callington and other places on the eastern slopes of the Mount Lofty Range. I have also seen the species at Nackara, two hundred miles north of Adelaide. These birds hawk for insects in much the same graceful manner as *Artamus personatus*, and make a similar chattering noise.”

Mr. Tom Carter writes me from Broome Hill, South-western Australia:—“*Merops ornatus* was numerous about the bed of the Gascoyne River, and not uncommon at some of the creeks inland from Point Cloates, during the winter months, but were rarely noticed there after November. At Broome Hill they are mostly seen in the summer months, about February and March, and in greatest numbers on very hot days. I have skins of fully fledged immature birds shot on 20th January. Near Busselton, on the Vasse River, a colony of these birds had dug out holes on open flats, and both eggs incubated and young birds in the nesting places were noted. I saw it at Kellerberin in January, 1903.”

For the purpose of breeding it tunnels generally in loose sandy soil for two or three feet, often more, at the extremity of which a chamber is hollowed out sufficiently large enough to comfortably accommodate the sitting bird. The nesting sites are varied, often they are in a gently sloping rise, rarely in the face of a steep bank, but frequently in the perfectly bare flat sandy soil. On the Namoi River and at West Narrabri, in November 1896, I found numbers of them in an open sandy waste, and close to a thick brigalow scrub. At Coonamble, in October 1905, there were comparatively few birds and their tunnels far apart; some were near the edge, others in the sandy soil among knee-high herbage.

Five is the usual number of eggs laid for a sitting, sometimes six, rarely seven. They are pure white, the shell being close grained, smooth and lustrous. A set of five taken by Mr. A. H. 1893, near Townsville, Queensland, on the 25th November, 1899, measure as follows:—Length

(A) 0·87 × 0·77 inches; (B) 0·91 × 0·73 inches; (C) 0·85 × 0·79 inches; (D) 0·84 × 0·78 inches; (E) 0·88 × 0·77 inches. A set of six taken by Mr. George Savidge at Copmanhurst, in the Upper Clarence District, New South Wales, on the 20th November, 1900, measures:—Length (A) 0·88 × 0·73 inches; (B) 0·91 × 0·76 inches; (C) 0·92 × 0·76 inches; (D) 0·89 × 0·72 inches; (E) 0·82 × 0·73 inches; (F) 0·87 × 0·73 inches.

Young birds resemble the adults, but are much duller in colour, the central pair of tail feathers are equal in length to the remainder, and are destitute of the attenuate elongations as in the adult; there is no blue streak below the black feathers on the sides of the face, the feathers on the fore neck, breast and abdomen are very dull green, the central portion of which is washed with blue, and there is only a small dull black patch, washed with blue, on the centre of the lower throat. Wing 3·8 inches.

In New South Wales October and the four following months constitute the usual breeding season of this species, but more eggs are usually laid in November. On Yandembah Station, between the 1st and 20th November, 1893, Mr. Charles Watson opened a great number of their nesting places, which contained from one to five fresh eggs. During different seasons I have obtained them on the Nepean, Namoi and Gwydir Rivers during the same month.

Sub-order HALCYONES.

Family ALCEDINIDÆ.

Sub-family ALCEDININÆ.

Genus *ALCYONE*, Swainson.

Alcyone azurea.

AZURE KINGFISHER.

Alcedo azurea, Lath., Ind. Orn., Suppl., p. xxxii. (1801).

Alcyone azurea, Gould, Bds. Austr., fol. Vol. II., pl. 25 (1848); *id.*, Hand-bk. Bds. Austr., Vol. I., p. 139 (1865); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 168 (1892); *id.*, Hand-l. Bds., Vol. II., p. 52 (1900).

Alcyone diemenensis, Gould, Proc. Zool. Soc., 1846, p. 19; *id.*, Handbk. Bds. Austr., Vol. I., p. 141 (1865).

ADULT MALE—General colour above ultramarine, brighter on the rump and upper tail-coverts; wings blackish, some of the upper wing-coverts and the outer webs of the secondaries indistinctly margined with dull ultramarine; on each side of the upper breast a large patch of ultramarine; tail ultramarine; throat and an oblong spot on each side of the neck white washed with rufous; remainder of the under surface cinnamon-rufous, darker on the lower sides of the body, where there is a slight lilac wash; bill black, brownish at the extreme tip; legs and feet dull orange; iris black. Total length in the flesh 6·8 inches, wing 2·9, tail 1·4, bill 1·65, tarsus 0·33.

ADULT FEMALE—The sexes are alike in plumage.

Distribution—Queensland, New South Wales, Victoria, South Australia, Tasmania.

THE range of the Azure or River Kingfisher extends over the greater portion of the coastal and contiguous mountain ranges and tablelands of Eastern and South-eastern Australia. Individual variation exists in this as in many other species, and which cannot always be attributed to climatic causes. Generally it is in the depth of colouring in the under parts; as a rule the farther north specimens are obtained the richer and darker they are, approaching a coppery hue. In the present instance a single specimen in the Australian Museum collection from Tasmania,

is as rich in colour as examples from the Herbert River, North-eastern Queensland, which is about the northern limit of its range. The wing-measurement, 3·1 inches, of the Tasmanian bird, however, slightly exceeds that of Australian examples. Several adult specimens in the collection have the oblong spot on the side of the neck pure white, and without any rufous wash. A remarkable long-billed specimen procured by Mr. Robert Grant, at Lithgow, on the Blue Mountains, New South Wales, has the entire throat whitish, also the centre of the breast, but the latter part has a slight rufous wash, and the bill measures two inches.

Usually this brilliantly plumaged little bird is more frequently met with in the spring and summer months, generally alone, sometimes in pairs, resorting principally to the lower branches of trees overhanging rivers, creeks and waterholes, or to the thickly-wooded steep banks of a stream. If one is taking a walk along one of its haunts, it generally flies close to the water and bank, and alights on a branch perhaps fifteen or twenty yards ahead. This may be repeated if the bird is disturbed several times, when it will either cross the river or stream flying low down, or turn round again and return to the spot whence it was first flushed. I have often watched these birds at Canterbury, and the head of Cook's River, while quietly seated under some sheltering tree, close to the edge of the bank, just about sunset after a hot summer's day. Everything then is almost perfectly still, broken only by the sucking noise made by numerous small fish as they rise to the surface, with alternately gaping and closed mouth, or the slight rustling movement made by *Acrocephalus australis* in reeds growing in the water near the opposite bank, and from which a Water Crake emerges and runs timidly over the weed-grown portion of the river. The shrill note of *Alcyon azurea* is heard, uttered during flight, as it passes from a low branch of a tree to a better vantage point, perhaps some partially submerged log, where it sits intent on the capture of its finny prey. The reflection of the fast setting sun makes a golden-red glow on the water, which is suddenly disturbed by the short but meteor-like flight of the Azure Kingfisher, its rich ultramarine plumage now strikingly contrasted with its surrounding setting of reflected golden-red water drops, the result of the bird's sudden plunge, and which now emerges with a small silvery-scaled fish in its bill. This species brings back memories, too, of my early collecting days, when slowly rowing in a boat under the willows growing on the banks of the Yarra and overhanging the river, near Melbourne, in quest of nests of the Black and White Fantail (*Sauloprocta melaleuca*), or better known "Willy Wagtail," and it was from that portion of the river between the Botanic Gardens and Punt Road, South Yarra, that I first became acquainted with the nesting-place of the Azure Kingfisher, and subsequently shared in the spoil of a set of six fresh glossy rosy-white eggs.

Its food consists chiefly of small fish, prawns and yabbies; also water insects, principally beetles.

Under date 21st October, 1892, Mr. J. A. Boyd wrote me from Ripple Creek, Herbert River, North-eastern Queensland:—"I found three burrows of *Alcyon azurea*; they were made in a stiff sandy clay in the side of a bank of a salt-water creek. How the bird tunnels in such hard material is a mystery. The holes were about eighteen inches in length; one had not been laid in, another contained three fresh eggs, and the third two eggs, which were addled and the contents partly dry." Writing on different dates subsequently, the following are Mr. Boyd's records:—"On the 4th September, 1894, an aboriginal brought me a set of five fresh eggs. I got five eggs, quite fresh, on the 27th February, 1897, and a set of six fresh eggs on the 15th March, 1897."

Mr. George Savidge sends me the following notes from Copmanhurst, on the Upper Clarence River, New South Wales:—" *Alcyon azurea* is plentifully dispersed along our rivers and water-courses. It usually breeds in a hole in a bank overhanging water, but I have also found their nests several hundred yards away from any stream. The chamber or tunnel is about three feet long, and the eggs are placed upon an accumulation of very fine fish bones. They usually lay

six eggs, but upon one occasion I rooted out a nest, and three eggs were laid, which I left, and when I visited the nest again about a week later the nest contained seven eggs. The breeding season commences early in September, and I have found eggs as late as December."

From Melbourne Mr. G. A. Keartland writes me as follows:—"One of the prettiest sights along the course of the Yarra is to watch *Alcyone azurea* sitting motionless on some snag or overhanging branch waiting for some small fish to approach the surface of the water in order to seize some insect. Just as the seizure is about to take place the Kingfisher darts into the water and emerges with the unwary fish in its bill, and then flies off to feed its young or devour its prey. I have never seen them fly overland."

From Adelaide Dr. A. M. Morgan sends me the following notes:—"A pair of *Alcyone azurea* are always to be seen in the Botanical Gardens, where they prey upon the young gold fish in the ornamental ponds. I have seen them at all times of the year. There are a few pairs on nearly all the creeks which I have visited, but I think the majority of them are only summer visitors. On the Torrens, at the Reedbeds, they are fairly numerous, and live upon a species of *Galaxias* and the small Crayfish (*Astacopsis bicarinatus*), which they capture by diving and then break up on a convenient log. They nest in any convenient bank, the hole being sometimes as much as four feet long, but I have not found a nest for many years, chiefly because I am loth to disturb so beautiful a bird."

Mr. Edwin Ashby writes me from Blackwood, South Australia:—" *Alcyone azurea* occurs infrequently throughout the Adelaide Hills, in suitable localities, generally small running streams or permanent waterholes. I have taken a bird out of a small tunnel bored in a creek bank, a foot or so above the water line."

Dr. Lonsdale Holden also, when resident at Circular Head, Tasmania, wrote me as follows:—"I have found the nest of *Alcyone diemenensis* once only, and that on the 29th October, 1899, near the mouth of Detention River, on the North-west coast of Tasmania; the nidification in all respects is like that of the English Kingfisher, a hollow in a bank over a river, and a scanty collection of tiny fish bones at the end of it. The hole would not admit my hand without enlargement, and sloped a little upwards; the nest chamber was the length of my fore-arm from the orifice, and might hold two small fists. The nest contained six hard set nearly round, glossy white eggs." Subsequently Dr. Holden sent me the following note:—"I was told of a nest where a bird was feeding young at Deep Creek, Duck River, on the 29th October, 1893; it was formed in the earth, between the roots of a fallen tree at the edge of the creek, and egg shells were seen outside the nesting place."

Under the name of *Alcyone diemenensis*, Mr. E. D. Atkinson, while resident at Table Cape, North-west Coast, Tasmania, forwarded me the eggs of this species for description, together with the following note:—"The eggs of *Alcyone diemenensis* were taken on 11th January, 1890, by Mr. M. Ford, who lives near me, from a hole in the bank of Seabrook Creek, in this neighbourhood. I have measured the hole, finding it, including the chamber, twenty inches in length; there was nothing in the way of a nest, only bare ground and a few small fish bones and scales." The two eggs from this nesting place measure respectively (A) 0.92 × 0.77 inches; (B) 0.93 × 0.8 inches.

The Rev. R. N. Atkinson, of Evandale, Tasmania, found a nesting place on the 31st October, 1887, containing six fresh eggs; it was in a hole in a bank, and the terminal enlarged chamber was scantily lined with fish bones.

For the purposes of breeding it digs a tunnel in a bank, usually about a foot or two above the surface of the water, and gently sloping upwards, for a length of from two feet six inches to three feet six inches in length, and in an enlarged chamber at the terminus deposits its eggs on a mass of cast fish-bones and scales or remains of crustaceans, or wing cases of water-beetles.

The eggs are almost invariably six, rarely five, in number for a sitting, and the instance previously referred to by Mr. George Savidge is the only one I have known when this number has been exceeded. When fresh they are of a beautiful glossy rosy-white changing to a pure glossy pearly-white when emptied of their contents. They are almost round in form, the shell being close-grained, smooth, and are among the most lustrous of any of our Australian birds' eggs. Two eggs of a set of six, taken in December, 1877, from the river bank near South Yarra, Victoria, measure as follows:—Length (A) 0·87 × 0·73 inches; (B) 0·88 × 0·73 inches. A set of six taken by Mr. J. A. Boyd at Ripple Creek, Herbert River, North-eastern Queensland, on the 15th March, 1897, measure:—Length (A) 1·86 × 0·75 inches; (B) 0·86 × 0·74 inches; (C) 0·87 × 0·73 inches; (D) 0·87 × 0·73 inches; (E) 0·84 × 0·7 inches; (F) 0·85 × 0·74 inches.

The usual breeding season in South-eastern Australia is during September and the four following months, but nests with eggs are more often found in November and December. As will be seen from Mr. J. A. Boyd's notes in North-eastern Queensland, he found fresh eggs from September until March. In South-eastern Australia and Tasmania fresh eggs may be found from October until the end of January.

Alcyon pulchra, described by Gould from a specimen obtained at Port Essington, ♀ is only a richer and darker coloured northern form, inhabiting the northern portions of the Australian continent, and is only subspecifically distinct from the preceding species. It may chiefly be distinguished by its slightly smaller size, intense ultramarine upper parts, dark coppery-rufous under surface, darker ultramarine patch on each side of the breast, and the more pronounced lilac wash to the lower flanks. The wing-measurement of an adult male procured by the late Mr. Alexander Morton at Port Essington, in February 1879, is 29 inches. Specimens from this part of the continent are richer and darker in colour than others procured at Derby, North-western Australia, by Mr. E. J. Cairn in 1886, and at Cairns, on the opposite side of the continent, by Messrs. E. J. Cairn and Robert Grant in 1887, the southern limits of its range. Specimens have also been recorded from Port Darwin, the Gulf of Carpentaria and Cape York.

In his "Monograph of the Alcedinidæ," Dr. R. Bowdler Sharpe regards it as quite distinct, and refers to it vernacularly as the Resplendent Kingfisher, but in the "Catalogue of Birds in the British Museum," † he only recognises it as subspecifically distinct from *Alcyon azurea*.

Messrs. E. J. Cairn and Robert Grant, while collecting on behalf of the Trustees of the Australian Museum, in 1887, on the coast and Bellenden Ker Range, in North-eastern Queensland, obtained among many others an adult male and female of *Alcyon pulchra*. One of them was procured on the Barron River, about thirty miles inland from Cairns, by Mr. E. J. Cairn, who, having shot the bird, had to swim to procure it. The other was captured in the nesting hole by Mr. Robert Grant, who has kindly supplied the following notes:—"On the 26th December, 1887, at Riverstone, about sixteen miles inland from Cairns, in company with an aboriginal called "Charlie," I saw a Kingfisher fly into a hole in the bank of a creek; after running forward and placing my hat over the entrance, I enlarged the opening with my sheath knife, and putting my hand in caught one of the parents. While engaged in securing it, my attention was drawn away from the nest for a moment, when to my surprise another bird flew out, so both the parent birds were in the hole at the same time. Afterwards, upon dissection, the bird I captured proved to be the male. The nest, if worthy of the name, was placed near the end of the tunnel, which was about sixteen inches in length and inclined upwards; it was composed of a few cast fish-bones and small pieces of decayed roots, but in all not sufficient to protect the eggs from the sandy soil

* Proc. Zool. Soc., 1846, p. 19. † Cat. Bds. Brit. Mus., Vol. XVII., p. 169 (1892).

at the bottom. The nest contained five eggs, three of which were unfortunately broken." The two remaining eggs are similar to those of *Alcyon azurea*, being rounded in form, pearly white, the shell being close-grained, smooth and glossy. Length (A) 0.87 × 0.73 inches; (B) 0.85 × 0.74 inches.

An egg taken from a hole in a bank of the Daly River, in the Northern Territory of South Australia, in April 1902, is rounded in form and glossy pearly-white. Length 0.85 × 0.7 inches.

Sub-family DACELONINÆ.

Genus SYMA, Lesson.

Syma flavirostris.

YELLOW-BILLED KINGFISHER.

Haleyon (Syma?) flavirostris, Gould, Proc. Zool. Soc., 1850, p. 200.

Haleyon flavirostris, Gould, Bds. Austr., Suppl. fol. Vol., pl. 5 (1869).

Syma flavirostris, Gould, Handbk. Bds. Austr., Vol. I., p. 135 (1865); Sharpe, Mon. Alced., p. 153, pl. 56 (1869).

ADULT MALE—*Head and hind neck rich cinnamon-rufous; a spot in front of the eye and a broken collar on the hind neck black; mantle blackish; scapulars and upper wing-coverts dull olive-green; quills blackish, the outer webs of the secondaries washed with dull olive-green; rump and upper tail-coverts greenish-blue; tail blue; throat and all the under surface and under tail-coverts pale cinnamon-rufous, lighter on the throat and abdomen, darker on the sides of the breast and flanks; bill yellow, with a dark brown mark along little more than the apical half of the culmen; legs and feet orange. Total length 7.5 inches, wing 3, tail 2.3, bill 1.25, tarsus 0.55.*

ADULT FEMALE—*Differs from the male in having the streak on each side of the neck slightly more pronounced, the under surface paler, and the crown of the head black.*

Distribution—Cape York Peninsula, North-eastern Queensland.

NO Australian Kingfisher is more restricted in its habitat than the present species, being exclusively confined to the Cape York Peninsula of North-eastern Queensland, and does not occur in the Northern Territory of South Australia, or in any other portion of the Australian Continent. The type was obtained by MacGillivray, during the stay of H.M.S. "Rattlesnake" at Cape York, and was described by Gould in the "Proceedings of the Zoological Society of London," in 1850.

In his "Monograph of the Alcedinidæ,"* Dr. R. Bowdler Sharpe correctly figures, describes and points out the distinguishing specific characters between *Syma flavirostris* and its close ally *S. torotoro*, inhabiting New Guinea. In the "Catalogue of Birds in the British Museum," † however, Dr. Sharpe, both in his key to the species and in the full description of each, unfortunately transposes the distinguishing characters respectively. In a number of specimens of *Syma torotoro* and *S. flavirostris* now before me, the former of which were obtained by the late Mr. Alexander Morton near the Laloki River, New Guinea, in 1878, on behalf of the Trustees of the Australian Museum, the distinguishing characters pointed out by Gould when describing *S. flavirostris*, are constant in both species.

While at Somerset, Cape York, in 1867-8, the late Mr. J. A. Thorpe informed me that he procured a number of specimens of *S. flavirostris*, and that this species chiefly frequented the dry open belts of timber inland, and was seldom met with in the dense coastal scrubs. Only on one occasion did he find its nesting place; it was in the cavity left by a broken-off hollow limb of a

* Mon. Alced., p. 153, pl. 56 (1869). † Cat. Bds. Brit. Mus., Vol. XVII., p. 196 (1892).

tree, and it contained four pearly-white eggs. Its habits, he informed me, appeared to be much the same as those of *Halcyon sanctus*. The members of the "Chevert Expedition," fitted out by the late Sir William Macleay, also obtained two specimens during their stay at Cape York in 1875.

A set of three eggs in Mr. G. A. Keartland's collection, taken by Mr. Bertie Jardine near Somerset, on the 3rd December 1898, are nearly round in form, pure white, the shell being close-grained, smooth and slightly lustrous. They measure:—Length (A) 1·04 × 0·87 inches; (B) 1·1 × 0·9 inches; (C) 1 × 0·87 inches.

Genus DACELO, Leach.

Dacelo gigas.

BROWN KINGFISHER.

Alcedo gigas, Bodd., Tabl. Pl. Enl., p. 40 (1783).

Dacelo gigantea, Gould, Bds. Austr., fol. Vol. II., pl. 18 (1848).

Dacelo gigas, Gould, Handbk. Bds. Austr., Vol. I., p. 122 (1865); North, Rec. Austr. Mus., Vol. II., p. 87 (1895); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 204 (1892); *id.*, Hand-l. Bds., Vol. II., p. 55 (1900).

ADULT MALE—Forehead and crown of the head brown mottled with rufous, and extending in a blackish-brown stripe down the centre of the head; nape brown; lores and ear-coverts dark brown; sides of the head and hind neck white, forming a broad collar; basal half of the primaries white, apical portion blackish; outermost secondaries blackish-brown, edged on their inner webs and tips with white, and slightly washed with bluish-green towards the tips of their outer webs; innermost secondaries and scapulars brown, the median series tipped with silvery-blue; lower portion of the back dull white barred with brown; feathers of the rump dusky at the base crossed with dull white and blackish-brown mottled with rufous, and largely tipped with pale greenish-blue; upper tail-coverts and tail rufous, barred with black, the centre tail feathers slightly tipped with white, and increasing in extent to the outermost feathers, which have their apical half white, and the cross-bars gradually decreasing in width towards the tip; cheeks and all the under surface dull white; upper mandible blackish-brown, the hooked tip whitish-horn colour, lower mandible pale fleshy-horn colour, sides of base blackish-brown; legs and feet very pale dingy greenish-yellow, almost white; iris rich dark brown. Total length in the flesh 17·5 inches, wing 8·6, tail 6·25, bill 2·5, tarsus 0·95.

ADULT FEMALE—Similar in plumage to the male, but with more rufous on the crown of the head and having a rufous marking at the sides of the nape, connecting it with the tips of the ear-coverts.

Distribution—Queensland, New South Wales, Victoria, South Australia.

THE range of the present species extends as far north in Queensland as the Endeavour River, Mr. Robert Hislop, Junr., informing me that he had observed it at Marton, near Cooktown, his brother, Mr. Frank Hislop, sending me a note of its breeding in the Bloomfield River District, and Mr. A. F. Smith states that it is more common at Cairns than its more brilliantly plumaged ally *Dacelo leachi*. It is freely distributed throughout Southern Queensland, New South Wales and Victoria; it is also found in the south-eastern portion of South Australia. It has been introduced into Western Australia and Tasmania, Mr. G. A. Keartland noting it between Fremantle and Perth,* and I observed it, much to my surprise, on Mount Wellington, near Hobart, in December 1906.

In a number of specimens now before me from different parts of Eastern Australia, the example with the purest white under surface and broadest collar on the hind neck, is an adult male procured by Messrs. E. J. Cairn and Robt. Grant, at Cairns, Queensland, and the one with

* Trans. Roy. Soc. S. A., Vol. XXII, p. 171 (1898).

the most brilliantly coloured silvery-blue tips to the median upper wing-coverts, and feathers of the rump, was obtained by Mr. William Chalker, at Colo Vale, New South Wales, and who forwarded at my request four specimens, so as to ascertain the food of this species during the depth of winter.

Stomachs of the birds referred to above contained the remains of insects, principally beetles belonging to the families Elateridæ, Curculionidæ and Carabidæ, and of other insects found about

or under bark. One stomach contained in addition to beetles, the remains of a large grass-hopper and portion of a small lizard; another one, the most distended of all, as well as the remains of insects a small Black Snake (*Pseudechis porphyriacus*), fourteen inches in length, and minus its head.

No bird is more universally known throughout the eastern and southern portions of the Australian continent than the Brown Kingfisher, or as it is more frequently called the "Laughing Jackass," and in New South Wales also the "Kookooburra." It was first figured by M. Sonnerat, in his "Voyage a la Nouvelle Guinée," in 1776, and subsequently described by Boddært in 1783. White, one of the earliest writers on the Australian fauna who visited these shores, also figures it in his "Voyage to New South Wales" under the name of the "Great Brown King's Fisher."

It frequents alike open forest and partially cleared lands, heavily timbered mountain ranges and the coastal scrubs if interspersed with trees of a larger growth. Far inland it is seldom met with at any distance from permanent water. The stout and powerful bill of this species is well

adapted for securing its prey, its food during spring and summer consisting principally of lizards, rats, mice and small birds and insects. It will also pounce upon and kill a small snake, or plunge into water, but more often in a partially dried creek or waterhole, to secure a fish. Ornamental fish ponds have often to be protected with wire-netting against the depredations of this species. It also eats prawns and small fresh water crayfish. About farms, when opportunities offer, it frequently varies its diet with young chickens. At Roseville a pair of these birds at various times, during the month of September 1905, devoured an entire brood of recently hatched chickens. In a number of stomachs, however, of these birds I have examined, lizards proved to be the staple article of their food.

It is one of the first birds to usher in the morn with its loud laughter-like notes, and although it may be heard again frequently throughout the day, it is generally about sunset when several are congregated close together in a tree, that the bush fairly resounds with their uproarious and eerie shrieks of merriment. In common with several species of Australian birds the Brown Kingfisher has, when perched, a curious habit of elevating the tail, more especially



BROWN KINGFISHER.

when it has just alighted upon a branch. It has rather a heavy and laboured flight, during which time the white bases to the quills are conspicuously displayed.

From the Bloomfield River, North-eastern Queensland, Mr. Frank Hislop sends me the following note :—" *Dacelo gigas* breeds in a Termites' mound on a tree. They generally lay three eggs, though often four. The birds are seldom seen in the scrub, except in the dry weather, and their nests are always in the forest land or just at the edge of the scrub. They live on lizards, small snakes, grasshoppers, and also small fish."

Mr. A. F. Smith writes me from Hambleton Plantation, near Cairns :—" *Dacelo gigas* is far commoner here than *D. leachi*, while the reverse is the case on the Herbert River, where *D. gigas* is almost unknown."

From Duaringa, on the Dawson River, Queensland, Mr. H. B. Barnard writes me :—" *Dacelo gigas* breeds in a hollow spout of a tree, or in a White Ants' nest built on a tree, and the eggs are three or four in number for a sitting. These birds are very pugnacious when their nest is being robbed. I once had one strike me on the arm with its beak, drawing the blood freely. They breed here from September to October."

Mr. George Savidge writes me from Copmanhurst, Upper Clarence River, New South Wales :—" *Dacelo gigas* is common here. They live on worms, grubs, beetles, lizards and mice. In this locality they are as often found breeding in the nests of Termites, on trees, as they are in the hollow spouts of limbs. It breeds mostly in September and October, although I have taken fresh eggs from the 29th September until the 9th November. One of these birds charged my black, who had climbed the tree in which it had its nest. The bird's beak entered just under his right eye; had it been an inch higher up it would have blinded him. The bird had young, and he never heard or saw it coming towards him."

From Cobborah Station, Cobhora, New South Wales, Mr. Thos. P. Austin writes me as follows :—" Until the 1902 drought *Dacelo gigas* was very plentiful throughout the Dubbo and Mudgee Districts, but now, in 1908, only occasional pairs are to be seen. I know of no bush bird which is more affected by a drought than *Dacelo gigas*. Why this should be it is difficult to understand, because their principal food consists of small birds and small mammals. During the winter of 1902 I noticed a great many of them dead. I once had two pet ones; these I often fed on raw meat till they would eat no more; I would then walk a short distance away from them, and hold up a dead Sparrow. They would be all excitement at once, and come to me as quickly as their short legs would carry them, when their appetites would be as keen as ever. My experience is that it is almost impossible to keep pet ones, as the wild birds will eventually come and kill them."

From Melbourne Mr. G. A. Keartland writes me :—" Although *Dacelo gigas* is plentiful in open forest lands, where their food consists chiefly of mice, lizards and young snakes, it is a common occurrence to see them dash into the water in several of the ornamental ponds in the public gardens around Melbourne and seize the goldfish. I once saw five eggs taken from a nesting place."

While resident at Hamilton, in South-western Victoria, Dr. W. Macgillivray wrote as follows relative to this species :—" Several of these birds had their nesting places within easy walking distance of Coleraine, so that I was able to keep them well under observation for the two seasons that I resided in that town. This bird very rarely nests in a natural hollow in a tree, nearly always excavating one for itself from the softened or rotten centre of a living or dead tree with its beak, a proceeding which usually takes some considerable time; once-formed the same hollow is resorted to year after year. The Sacred Kingfisher has the same habit, but occasionally makes use of the bank of a creek. When food, which generally consists of lizards, beetles, worms, frogs, crayfish, and other small fry is plentiful, a full brood of three or four young ones

is reared, but during the two seasons 1896 and 1897, at Coleraine, which were very dry, though two or three eggs were usually laid and hatched, not more than one young bird was reared in any of the nests."

Mr. Edwin Ashby sends me the following notes from South Australia:—" *Dacelo gigas* is becoming very common around Adelaide; wherever the timber is large the hearty note of this species is often heard, even in the suburbs of the city, attracted perhaps by tame ones often kept as pets by residents. I have met with it in every part of Victoria I have visited, wherever the country is timbered, and also found it common on the Blackall Ranges, in South-eastern Queensland."

Dr. A. M. Morgan writes me:—" *Dacelo gigas* is common throughout the southern parts of South Australia. It lays two or three eggs, generally two, in any suitable hollow spout of a gum tree, although I have seen a number of nesting places in rotten limbs and tree trunks dug out by the birds themselves. I have never seen this species north of Port Augusta."

For the purposes of breeding it selects a broken-off hollow limb or hole in the trunk of a tree, or tunnels one in a nest of Termites or White Ant, built on a tree. In New South Wales the latter site is usually chosen whenever available. The eggs are deposited on the decaying wood when laid in cavities of trees, and on the dust in an enlarged chamber at the end of a tunnel when resorting to the nests of the Termites. It has also been known to form its nest in a Stag-horn fern. In the task of tunnelling the sexes work alternately, relieving one another about every ten minutes. The nesting site varies in height according to the locality in which it is found. Generally it is between twenty and forty feet from the ground, sometimes as high as sixty feet or more, and on rare occasions in country districts, where unmolested, almost within hand reach.

The eggs are usually three or four, seldom five, in number for a sitting. Typically they are a rounded oval in form, occasionally they are elliptical, and sometimes compressed towards one end. When fresh they are of a beautiful pearly white, and the surface of the shell is very smooth and glossy. Incubated eggs, more especially those laid in a Termites nest lose their pristine loveliness, and even when emptied of their contents, the shell is dull and lustreless. A set of four taken at Lewis Ponds, New South Wales, measures:—Length (A) 1.87 × 1.45 inches; (B) 1.78 × 1.41 inches; (C) 1.72 × 1.38 inches; (D) 1.73 × 1.4 inches. A set of three taken at Lindfield near Sydney, on the 3rd October, 1898, measures:—Length (A) 1.87 × 1.42 inches; (B) 1.87 × 1.4 inches; (C) 1.77 × 1.38 inches.

The breeding season commences in August and continues until the end of January. October and November, however, are the principal months for obtaining the eggs of this species in New South Wales and Queensland. Incubation lasts about eighteen days, and the young birds leave the nesting place when they are about four weeks old. For a week before they essay their first flight they crowd to the entrance of the nesting place and keep up an incessant clamour for food. Their united cries are equally bewildering to one, as are those of the parent bird when heard for the first time. Although I have seen these birds retire and remain away from the tree, while their nesting place in a Termites mound was ruthlessly broken into and robbed of its treasures, they generally valiantly defend their young. As a proof of the determination and courage of these birds, during a Sparrow-shooting match at Walhalla in Victoria, a Brown Kingfisher three times braved the dangers of the field, descending amid the noise and smoke and carrying off with it a dead Sparrow on each occasion. As each was secured it was borne away to a neighbouring tree, where after battering its skull against a branch, it was quickly devoured by the intrepid bird.

A pair of these birds used to breed every year in a tree close to my house at Roseville, and were very tame, feeding their young in the garden, and were very friendly with a pair of Magpie-Larks. Strange to remark, the only birds that used to interfere with them were a pair of Black

and White Fantails (*Sauloprocta melaleuca*), who had nested under the hood of one of our windows. I often expected to see one or the other of the latter birds pay for their temerity with their lives, but they persisted in mobbing and teasing the "Jacks," until they left the place.

The nesting-place of *Dacelo gigas*, in a White Ant's mound on a tree, figured on Plate A. 13, I found at Lindfield, on the 3rd October, 1898, while in company with Mr. C. G. Johnston and Mr. D. Swift. It was about forty feet from the ground, and the latter, who climbed to it, secured three partially incubated eggs, and I photographed the nesting-site on the following day. Where the tree stood, at the present time is one of the most flourishing thoroughfares of this rising suburb. On the 5th October, 1908, ten years later from the date of taking this set, Mr. F. A. Shelley, at Roseville, pointed me out the nesting-place of *D. gigas* in the hollow limb of a gum-tree in Bancroft Avenue, from which the previous season he had taken three eggs. In another hollow branch on the opposite side of the tree *Halcyon sanctus* was nesting. A month later this tree was cut down while clearing the land for building purposes, and three recently hatched young *Dacelo gigas* were destroyed.

The tendency to partial or total albinism apparently exists more in this species than any other Australian bird, judging by the number of examples represented in the Australian Museum collection. A semi-albino adult female was received in the flesh in June 1895, from Mr. F. J. Parks of "Thirribir," Boggabri, New South Wales, who subsequently forwarded the following note:—"The semi-albino Great Kingfisher I sent you was accidentally poisoned by eating mice that had been destroyed by strychnine, and was found by one of my men. I had been protecting this bird for some years, which used to feed at the door and nest in a tree close to the house, and was very sorry when the poor fellow died; at the same time I was glad that it was found before it was too far decayed to preserve as a *rara avis*." As the bird was in perfect plumage I took the opportunity of describing it. The general colour above and below is pure white; a spot in front of the eye and a broad line extending from the gape to the ear-coverts dull rufous; ear-coverts rufous-brown with white shaft lines; median portion of the lengthened crest feathers and an indistinct nuchal spot, dull rufous; scapulars and interscapular region slightly washed with brown; the lower back faintly barred with brown; rump and upper tail-coverts dull rusty-rufous, the former indistinctly barred with silvery-blue, the latter with white; tail white, two central tail-feathers freckled with dull rufous on their basal portion, and irregularly barred with the same colour, except at the tips; remainder of the tail-feathers barred alternately with rufous and brown cross-bars for three-fourths of their length, the bars decreasing in extent towards the outermost feathers, where the rufous bars are entirely lost, and the brown bars become narrow zigzag lines, except at the base; primaries pale brown, white at the base; secondaries pale brown, broadly edged with white on their inner webs; bastard-wing, primary and greater wing-coverts brown, the innermost series of the latter white; median wing-coverts pale brown, the outermost series largely tipped with white, and the innermost series with silvery-white; lesser wing-coverts pale brown with whitish tips; axillaries and under primary-coverts white, narrowly and indistinctly barred with dusky-brown; upper mandible brown, the lower one fleshy-white; iris rich reddish-brown; legs and feet pale yellowish-brown. Total length in the flesh 17.3 inches, wing 9, tail 7, culmen 2.45, tarsus 1.05.

Of the albino specimens of *Dacelo gigas* in the Australian Museum collection, the finest example was sent by an unknown donor from Berrima, New South Wales, in 1892. This specimen has the entire plumage snow-white, with the exception of one or two of the inner and concealed plumes of the ear-coverts, which are dark brown; bill dull yellowish-white, with a few short patchy streaks of blackish-brown; legs and feet yellow. In another albino specimen obtained at Bowral, and received from the Hon. W. A. Long in 1890, the only trace of its normal plumage is likewise in the concealed plumes of the ear-coverts, and in a few brown feathers among the lesser wing-coverts.

Dacelo leachii.

LEACH'S KINGFISHER.

Dacelo leachii, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 205 (1826 *ex* Lath., MSS.); Gould, Bds. Austr., fol. Vol. II., pl. 19 (1848); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 206 (1892); *id.*, Hand-l. Bds., Vol. II., p. 55 (1900).

ADULT MALE—*General colour above brown with paler brown margins to the feathers; centre of upper back white; lower back and rump silvery-blue; upper tail-coverts brown washed with blue, the larger ones having a sub-apical whitish streak except near the shaft, and narrowly edged with white at the tip; tail feathers deep blue tipped with white, these tips increasing in size towards the outermost feather on either side, and all except the central pair irregularly barred with deep blue passing into dark brown towards the margin of the inner web, the white interspaces of some of the feathers near the central pair washed with rufous; lesser wing-coverts brown with paler brown margins, the median coverts brown, broadly tipped with blue, the inner ones silvery-blue on their apical half, white on the basal half, most of them with a more or less concealed spot or bar of brown in the centre; quills blackish-brown on their inner webs and tips, dark blue on their outer ones, base of the primaries white; crown and sides of the head white streaked with dark brown, collar round the hind neck white, some of the feathers with a very narrow transverse blackish-brown bar across the centre; chin and upper throat dull white, remainder of the under surface dull white, each feather having two or more wavy cross bars or lines of brown; the under tail-coverts a slightly purer white and similarly crossed with lines of brown; bill brown, the cutting edge of the basal portion of the upper mandible and the entire lower mandible, except a brown spot at the side of the base, fleshy-brownish-white; "legs and feet fleshy-brown; iris white" (Barnard). Total length 15.5 inches, wing 7.8, tail 5.5, bill 2.35, tarsus 1.*

ADULT FEMALE—*Similar in plumage to the male but slightly larger, the outer webs of the quills edged with dull greenish-blue, instead of being entirely deep blue as in the male, and the upper tail-coverts and tail feathers cinnamon-rufous, conspicuously barred with dark blue. Wing 8 inches.*

Distribution—Eastern Queensland.

THE type of this remarkably handsome Kingfisher was described by Messrs. Vigors and Horsfield in the "Transactions of the Linnean Society of London," and named in honour of Dr. William Leach, and they remark:—"The specimen of this species in the Society's collection was presented by Mr. Brown, who discovered it on the 24th October, 1802, in Keppel Bay, on the East Coast (Queensland). The species was subsequently met with at Shoalwater Bay, Broad Sound, on the same coast."

Leach's Kingfisher is smaller than the preceding species, *Dacelo gigas*, the wing-measurement of adult males varying from half an inch to seven-tenths of an inch shorter than in that species. What, however, it lacks in size, which is not so apparent, is more than compensated for by the more brilliantly coloured plumage of its wings, rump and tail. Of the specimens in the Australian Museum collection, there is an adult male and a female procured by Mr. George Masters near Brisbane, Queensland, in April, 1865. In addition to the difference in sexual characters of the plumage, pointed out above, the females have usually a larger and more robust bill. Specimens from Cairns and Cooktown may be distinguished by a very slight tinge of buff on the under tail-coverts. Wing 7.7 inches. Apparently this buff wash to the under parts increases, and the size decreases, the farther north the specimens are obtained. In very old birds of both sexes, too, the feathers of the head, which are sub-crested, have the blackish-brown central streaks down the feathers of the crown of the head very much narrower, while immature birds have them broader, the females also having the blue cross-bars on the tail broader than in the adult bird. Many adult males have no rufous wash on the interspaces of the apical portion of the inner webs of the tail feathers.

In the "Catalogue of Birds in the British Museum," Dr. R. Bowdler Sharpe includes Northern Australia from Cape York to Port Darwin and Port Essington, in the range of *Dacelo leachii*. It must be remembered, however, that the types of this species were obtained at Broad Sound, Shoalwater Bay and Keppel Bay, which are all in the South Central Coastal Districts of Eastern Queensland, and adult specimens from these parts are destitute of the buff wash, which are typical of *D. cervina*, and of examples procured at Cape York, Port Essington, and Port Darwin in Northern Australia.

The habits and food of Leach's Kingfisher are precisely similar to those of the preceding species. There is, however, although equally peculiar, a very great difference in its notes. When I first heard them shortly after day-break, I truly mistook them for the short guttural bark of a dog, or of a dog with a bone in its throat, but instead of, as I thought, proceeding from a fine Irish Setter the late Mr. Neville Cayley had in his possession, it came from a caged pet *Dacelo leachii*, and one that frequently formed the subject of his water-colour paintings.

Mr. Bertie Hislop informs me that it is fairly common at Cooktown, and Messrs. Lamrock and Robinson record in "The Ibis" † adult and immature birds procured by Mr. E. A. Olive in the same locality.

Mr. Frank Hislop writes me:—" *Dacelo leachii* is not numerous in the Bloomfield River District, but they are more plentiful further inland. They live on grasshoppers and other large insects; also on small lizards."

Dr. W. Macgillivray sends me the following note:—" In the Cloncurry District, Northern Queensland, *Dacelo leachii* nests in October, and like other Kingfishers digs out a hole for itself in a rotten tree, or occupies one that has been previously dug out."

Messrs. E. J. Cairn and Robert Grant obtained this species while collecting on behalf of the Trustees of the Australian Museum in North-eastern Queensland, and the latter has given me the following notes:—" *Dacelo leachii* we found in scattered pairs, in the open forest country between Cairns and Double Island, but on one occasion I saw six congregated together on a large gum tree close to the beach, two of which I secured. They usually pour forth their weird and undecipherable notes in the early morning and again just about dusk. During the many months we spent upon the mountains I only saw one pair in an open forest patch known as Peterson's Pocket. The stomachs of the birds examined contained small lizards, grubs, grasshoppers and other insects."

From Ripple Creek, Herbert River, Mr. J. A. Boyd wrote me:—" On the 8th November, 1894, the blacks brought me two nearly fledged young of *Dacelo leachii*," and again on the 5th March, 1897, " I saw to day a couple of *Dacelo leachii* well able to fly, but still having the nest note."

The preceding descriptions of Leach's Kingfisher are taken from a pair of specimens in breeding plumage, in the Australian Museum collection, procured by Mr. H. G. Barnard, at Bimbi, Duaringa, Queensland, on the 5th October, 1906. The birds were shot at the nesting-place, from which three eggs were taken, and all were forwarded to me, together with the following note:—" *Dacelo leachii* is not nearly so plentiful in these parts as *D. gigas*, and is a much shyer bird. It chiefly breeds in hollow spouts in trees, the length of the hole from the entrance to where the eggs are laid being from one to two feet, though it occasionally uses the White Ant's nests built on trees. The eggs are usually three, rarely four in number for a sitting; I once watched a pair of these birds for half an hour feeding their young, and to judge from the following their diet is frequent and varied—a tree snake about eighteen inches long, a frilled lizard nearly a foot long, two large grasshoppers, and a large grey spider; as this was in half an hour, what would the amount be for a day? The female does the hatching, the male feeding her the whole time. The breeding season commences about the middle of August and lasts until the end of November."

* Cat. Bds. Brit. Mus., Vol. XVII., p. 206 (1892).

† Ibis, 1900, p. 639.

From Mr. H. G. Barnard's notes it will be seen that the usual nesting-place of *Dacelo leachii* is in a hollow spout or hole in a limb of a tree, but it seldom burrows into a White Ant's nest on a tree.

The eggs are usually three, sometimes four in number for a sitting, rounded oval in form, pure white, the shell being close-grained, smooth and slightly lustrous. A set of three in the Australian Museum collection, taken by Mr. H. G. Barnard, at Bimbi, Duaringa, Queensland, on the 5th October, 1906, measures:—Length (A) 1.95 × 1.5 inches; (B) 1.97 × 1.47 inches; (C) 1.94 × 1.47 inches.

Although this species is smaller, their eggs are typically larger than those of *Dacelo gigas*.

August and the three following months constitute the breeding season in the lower Central Districts of Queensland, but at Ripple Creek in the North-eastern portion of that State, Mr. J. A. Boyd noted recently fledged young from November until the end of February.

The Fawn-breasted Kingfisher *Dacelo cervina* described and figured by Gould in his folio edition of the Birds of Australia,* is only a geographical variation, or subspecifically distinct from the preceding species *D. leachii*. In his original description Gould remarks:—"The northern and north-western portions of Australia constitute the true habitat of this species," but in his "Handbook to the Birds of Australia" † omits Northern Australia, although he states "specimens of it have formed a part of every collection made at Port Essington." *Dacelo cervina* may be distinguished by its smaller size, fulvous wash to the collar on the hind neck, and fulvous-buff under parts. An adult male measures:—Total length 14.7 inches, wing 7, tail 5, bill 2.4, tarsus 1. Wing-measurement of adult female 7.5 inches.

Specimens in the Australian Museum collection procured by the late Mr. Alexander Morton at Port Essington, in February 1879, and by Mr. H. W. Christie at Point Charles in April 1908, in the Northern Territory of South Australia, are typical *D. cervina*. The subspecific distinction accorded to the northern and north-western race does not hold good in many instances, and intermediate forms occur. Specimens from Derby, North-western Australia, collected by Mr. E. J. Cairn, and a male and female from the same locality, received from the Perth Museum, are except for their slightly smaller size, and in the former a washed-out appearance, almost similar to the specimens of *D. leachii* obtained at Cairns and Cooktown in North-eastern Queensland. An adult male and female procured by Mr. E. H. Saunders on Kurratha Station, thirty-six miles south-west of Roeburne, North-western Australia, are larger than examples from Port Darwin and Port Essington, and are furthermore distinguished by the very narrow brown streaks down the centre of the feathers on the crown of the head, and have a broad white collar on the hind neck, the upper part slightly washed with pale creamy-buff, the throat white, the wing-coverts of a pale silvery-blue, remainder of the under surface creamy-buff with very faint and narrow wavy transverse brown barrings, the wing-measurement being respectively 7.6 and 7.8 inches.

In the Catalogue of Birds in the British Museum ‡ Dr. R. Bowdler Sharpe includes Cape York in the habitat of *Dacelo cervina*. I agree, however, with Dr. Ernst Hartert in "Novitates Zoologicae," § in regarding specimens from Cape York and the Gulf of Carpentaria as intermediate between *D. leachii* and *D. cervina*.

Relative to this northern and north-western form, Mr. H. G. Barnard writes me as follows:—"While in the Northern Territory of South Australia I found a nesting place of *Dacelo cervina*

* Gould, Bds. Austr., fol. Vol. II., pl. 20 (1848.)

† Gould, Handbk. Bds. Austr., Vol. I., p. 125 (1865).

‡ Vol. XVII., p. 208 (1892).

§ Nov. Zool., Vol. XII., p. 214 (1905.)

at Pine Creek on the 25th September, 1896. It was in a hollow spout of a swamp gum (*Eucalyptus*) fifteen feet from the ground, and contained two slightly incubated eggs. I found another on the 9th November, 1896, at Somerset, Cape York, in the hollow spout of a paper-bark tree (*Melaleuca*). The note of *Dacelo cervina* is indistinguishable from that of *D. leachii*, which bird it closely resembles."

From Western Australia Mr. Tom Carter sends me the following notes:—"The Fawn-breasted Kingfisher (*Dacelo cervina*), was common about the beds of the great rivers of the north-west of this State. They were very numerous all along the Gascoyne and Lyons Rivers, and their loud cackling notes were heard at early day and again in the evening. In the heat of the day they sleep in dense foliage, and are silent. On October 4th, 1902, I heard their unmistakable notes on the Minilya River for the first time, although I had been across and about it hundreds of times for many years. This was apparently a first visit of the birds. The owners of gardens near the Gascoyne River at Carnarvon, welcomed the presence of these birds, as they caught many mice, snakes, and Silver Eyes (*Zosterops gouldi*)."

During the journey of the Calvert Exploring Expedition in Western Australia, Mr. G. A. Keartland obtained two adult females, one adult male and one young male, and writes me:—" *Dacelo cervina* was first seen and heard on the Fitzroy River, in North-western Australia, where these birds were numerous; and I also found them sparingly scattered through the West Kimberley District. It is readily distinguished by its discordant notes, which convey the idea that something is wrong with its throat."

A set of three eggs taken at Brock's Creek, in the Northern Territory of South Australia, from the hollow spout of a tree, in January 1903, are indistinguishable except for their smaller size from those of its close congener *Dacelo leachii*, and measure:—Length (A) 1·67 × 1·38 inches; (B) 1·72 × 1·37 inches; (C) 1·65 × 1·35 inches.

Genus HALCYON, Swainson.

Halcyon macleayi.

MACLEAY'S KINGFISHER.

Halcyon macleayi, Jard. and Selby, Ill. Orn., pl. 101 (1825-39); Gould, Bds. Austr., fol. Vol. II., pl. 24 (1848); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 254 (1892); *id.*, Hand-l. Bds., Vol. II., p. 58 (1900).

Cyanalcyon macleayi, Gould, Handbk. Bds. Austr., Vol. I., p. 133 (1865).

ADULT MALE—Forehead, lores, a line below each eye and the ear-coverts black; immediately behind the nostril a large white spot; head, wings and tail ultramarine; inner webs of the quills blackish, the base of all but the outer primaries white, forming a band when the wing is extended; upper wing-coverts bright blue; scapulars and back greenish-cobalt; rump cobalt-blue; upper tail-coverts ultramarine; a broad collar on the hind neck white; sides of neck and all the under surface, the under wing and under tail-coverts white, the lower sides of the body washed with buff; bill black, the lower portion of basal half of the under mandible pearly flesh white; legs and feet dark leaden-grey; iris dark brown, almost black. Total length in the flesh 8·5 inches, wing 2·75, tail 2·5, bill 1·5, tarsus 0·5.

ADULT FEMALE—Resembles the male but is destitute of the white collar on the hind neck, this part being ultramarine like the crown of the head and mantle.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, Northern New South Wales.



MACLEAY'S KINGFISHER.

THE present species was originally described and figured by Messrs. Jardine and Selby in their "Illustrations of Ornithology," and dedicated to the late Hon. Alexander Macleay, F.R.S., F.L.S., Colonial Secretary of New South Wales in 1823, and one of the original members of the Committee of the Australian Museum from its inception in 1836. There is a large and beautiful old oil-painting of this gentleman, hung in the Curator's room.

Macleay's Kingfisher is widely distributed over the coastal portions and the contiguous districts of the northern half of the Australian continent. The late Mr. T. H. Bowyer-Bower procured specimens near Derby, in North-western Australia in 1886, and it has been recorded in many collections formed in the Northern Territory of South Australia and Northern and Eastern Queensland. In New South Wales it is common from the Tweed River to the Bellinger River District in the north-eastern portion of the State, and of its range westward Messrs. J. D. Cox and A. G. Hamilton record a single specimen obtained by Mr. H. Thurston at Holyoak Bridge, Mudgee, but evidently a straggler.* In company with Mr. G. Savidge I found it fairly plentiful in the Upper Clarence River District, where several sets of its eggs were taken during my stay there in 1898. I also noted it on the Tweed River in 1907. In Queensland Messrs. E. J. Cairn and Robt. Grant obtained numerous specimens near Cairns, and I have received many sets of its eggs from Mr. J. A. Boyd while resident at Ripple Creek, Herbert River; also eggs taken by Mr. Bertie Hislop, in the Bloomfield River District.

It is undoubtedly the most brilliantly plumaged member of the genus *Halcyon*, and the white patch on the quills is conspicuously displayed during flight. The figure represents an adult male.

Mr. Frank Hislop sends me the following note:—" *Halcyon macleayi* in the Bloomfield River District, North-eastern Queensland, is only seen in the forest land and often miles from water. They build in Termites' nests on trees, and five eggs are generally laid. I do not think the birds sit on their eggs much, as the heat in the nesting site in which they are is sufficient to hatch them. When they have eggs or young ones in the nest the birds are very vicious, they will attack a person when attempting to interfere with them. I have known them make a black come down before he has been able to get the eggs, both birds coming at once from different directions, nearly always going for a person's head. They live on grasshoppers and other large insects. The native name for them is 'Yindilly.' "

From Dnaringa, on the Dawson River, Queensland, Mr. H. G. Barnard writes me:—" *Halcyon macleayi* is not a stationary species here; the birds generally appear in the beginning of September and soon get to work drilling holes in the White Ants' nests on trees where they deposit their eggs four to six in number."

From Copmanhurst, Upper Clarence District, New South Wales, Mr. George Savidge sends me the following notes:—" *Halcyon macleayi* usually breeds in White Ants' nests on trees

* Proc. Linn. Soc. N. S. Wales, 2nd Ser., Vol. IV., p. 402 (1889).

and lays five or six eggs. One nest containing eggs was found by the school children here in a mound of earth between the forks of an uprooted tree, also near by was the nest and eggs of *Pardalotus melanocephalus*, of which I sent you a photograph. On two occasions I have found these birds dead under the trees containing White Ants' nests, the crusts or outside of them being very hard to break into, and I have no doubt that the birds killed themselves in trying to make an opening. I have watched these birds starting to open the White Ants' nests, and they fly at a great speed, striking the nest with their strong bills; one cannot help but wonder how they stand the impact. They breed twice in each year, early in October and at the end of December. The birds are chiefly migratory, arriving very early in September, a few remaining during the winter. The photograph I send you of the Termites' nest containing nesting-site of *H. macleayi*, was placed on the side of a Broad-leaved Appletree (*Angophora subvelutina*) trunk, about eight feet from the ground, on the Copmanhurst and Smith's Creek road; the birds had not laid."



NESTING-PLACE OF MACLEAY'S KINGFISHER IN
TERMITES' NEST.

Mr. Robert Grant, Taxidermist of the Australian Museum, has given me the following notes:—"I found *Halcyon macleayi* plentiful in the forest near the coast at Cairns, North-eastern Queensland, also on the table-lands on the Herberton District farther inland. In New South Wales, these birds are common on the Bellinger and Macleay Rivers, and I have often seen them perched on the telegraph wires near the town of Kempsey. Their call may be heard very early in the morning or soon after day-break, and they are easy birds to approach. The stomachs of the many specimens I have examined contained principally the remains of grasshoppers and other insects, small lizards, and portions of worms."

Mr. Edwin Ashby writes me:—"Halcyon macleayi was common in the forest north of Brisbane, also in the open clearings in scrub-land on the Blackall Range. The old birds were feeding fledged young at the end of September; the garrulous cries of the young made one of the most prominent sounds of the bird-life of the bush."

For the purposes of breeding it usually forms a tunnel in a White Ants' nest on a tree, and in an enlarged chamber at the terminus lays four or five, rarely six, rounded pearly-white eggs. Sometimes the nesting-place is low down, often at an altitude of between twenty and thirty feet, but seldom more than fifty or sixty feet from the ground.

The eggs vary from four to six in number for a sitting, in New South Wales five eggs more often constitute the usual complement, they are rounded in form, many specimens being abruptly pointed at the smaller end, pure white, the shell being close-grained, smooth, and usually lustrous. Some eggs, especially those received from Mr. J. A. Boyd, when resident at Ripple Creek, Herbert River, Queensland, are coated with the reddish-brown earth of the Termites' nest, and when

this is removed they are usually found to be almost lustreless. A set of six taken by Mr. Boyd, on the 18th November, 1893, measure as follows:—Length (A) 1×0.82 inches; (B) 1×0.81 inches; (C) 1.02×0.85 inches; (D) 1.02×0.85 inches; (E) 1.01×0.85 inches; (F) 0.98×0.83 inches. A set of five I saw Mr. George Savidge take at Copmanhurst, on the 9th November, 1898, measure:—Length (A) 0.98×0.82 inches; (B) 0.98×0.86 inches; (C) 0.98×0.85 inches; (D) 0.96×0.83 inches; (E) 0.97×0.85 inches.

During many years observations by Mr. J. A. Boyd, while resident at Ripple Creek, September and the three following months constituted the usual breeding season of this species. The greater number of fresh eggs, however, was found in November. An early record of their breeding, was when he saw adults feeding young ones on the 3rd September, 1889. On the 18th November, 1893, he took three sets of eggs, two of four, and one of six eggs. Two days after he took another set of four, the latest record of his finding eggs of this species. In New South Wales, as noted by Mr. Savidge, this species breeds twice during the season, and I have received sets of these eggs from the Tweed and Clarence Rivers taken in October and December.

Halcyon pyrrhopygia.

RED-BACKED KINGFISHER.

Halcyon pyrrhopygia, Gould, Proc. Zool. Soc., 1840, p. 113; *id.*, Bds. Austr., fol. Vol. II., pl. 22 (1848).

Todirhamphus pyrrhopygius, Gould, Handbk. Bds. Austr., Vol. I., p. 130 (1865).

Halcyon pyrrhopygius, Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 258 (1892); *id.*, Hand-l. Bds., Vol. II., p. 59 (1900).

ADULT MALE—*Crown of the head white, broadly streaked with dull green: a line extending from the nostrils over each eye and the occiput white; feathers in front of the eye blackish; ear-coverts and a band around the hind neck black; mantle dull green; inner scapulars white streaked with dull green at the tips; wings greenish-blue, of a clearer blue on the greater wing-coverts and outer secondaries: back, rump and upper tail-coverts orange-rufous; tail greenish-blue, the outermost feather on either side whitish, and washed with blue on the inner web; a broad collar on the lower portion of the hind neck and all the under surface white; bill blackish, the basal half of the lower mandible flesh-colour; legs and feet greyish-black; iris black. Total length in the flesh 8.8 inches, wing 4, tail 2.8, bill 1.5, tarsus 0.62.*

ADULT FEMALE—*Resembles the male, but is duller in plumage on the upper parts, the streaks on the crown of the head are of a dull greenish-black; the mantle has a distinct dusky wash, and the wings are of a far less brilliant blue.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Central Australia, Western Australia.

THESE are few birds more generally distributed over the inland portion of the Australian continent than the Red-backed Kingfisher. Nowhere, however, does it appear to be stationary, and it is strictly a spring and summer visitant to the Central and Western Districts of New South Wales. Although so generally distributed, it is by no means so common as the preceding species, and, unlike the Sacred Kingfisher, it is often found frequenting the most arid situations, and far removed from permanent water. In New South Wales it is chiefly confined to the drier portions of the State, and I have never met with it in the coastal districts or anywhere on the eastern side of the Blue Mountains. During a period of drought inland Mr. George Savidge forwarded me a specimen for examination he had obtained at Copmanhurst, on the Upper Clarence River, about eighty miles from the coast. He informed me it was the only example he had seen in the district, and when he shot the bird it was perching on a

telegraph wire. I observed it near the Namoi and Gwydir Rivers, in Northern New South Wales, and there are specimens in the Australian Museum collection procured by me at Moree, four hundred and thirteen miles north of Sydney; also at Coonamble, three hundred and seventy eight miles west of Sydney. In enumerating a list of the birds of the Mudgee District, Messrs. J. D. Cox and A. G. Hamilton* remark of *Halcyon pyrrhopygius*:—"We have noticed this bird first on the 8th September, and taken eggs on the 18th November. Last seen on the 21st March. They have a *penchant* for sitting on the telegraph wires."

This species is another instance of a bird not occurring near the coast in New South Wales, although it does inland, while in Queensland it occurs both inland and on the coast, and there are specimens in the collection obtained by Mr. George Masters at Port Denison in 1867. There is also another, an adult female, procured by him in South Australia in 1864, but the precise locality is not recorded on the label, and it differs from any other example in the collection by having a decided rufous wash extending over the mantle on to the broad white collar of the lower portion of the hind neck.

It loves to perch near the end of a dead branch, a position favorable for obtaining its prey, which consists principally of small reptiles, insects of various kinds, and young birds. Close by where I shot a pair of these birds at Coonamble, a small colony of Fairy Martins had built their nests on the under side of a leaning *Eucalyptus*, and within two feet of the ground. I had been watching these nests for a week or more, when one morning I found the necks of several of the nests wrenched off, also portions of the nests, and a mass of mud-pellets, feathers, grass and newly hatched dead young ones, all mixed up together on the ground. Whether the damage had been done by this pair of Red-backed Kingfishers, as in a similar instance recorded by the late Mr. K. H. Bennett, I know not, but I attributed it to a pair of Ravens, who had a nest in the neighbourhood.

From Duaringa, on the Dawson River, Queensland, Mr. H. G. Barnard sends me the following note:—" *Halcyon pyrrhopygius* usually breeds here in a hole in the bank of a creek, and sometimes in the nests of Termites on trees. In October, 1907, three sets taken by me contained five eggs in each."

From Cobborah Station, Cobbara, New South Wales, Mr. Thos. P. Austin writes me as follows:—"The first time I knew of *Halcyon pyrrhopygius* visiting these parts was during September 1907, when several pairs came here to breed. Of four nests I examined that season I found an adult bird dead within two of them. This season (1908) I have examined seven nests, five of which had eggs, the other two young. They are rather late breeders; most of them start nesting about the end of November. I have never known them to nest in a tree, but they always drill a hole into the bank of a creek, and usually a dry one. In choosing a situation for their nest they differ from *Halcyon sanctus*; the latter species usually makes a hole in soft sandy soil at the top of a bank, but *H. pyrrhopygius* appears to be able to drill its nesting hole almost anywhere, even into hard clay and gravel, and is very often about half way down the bank."

The late Mr. K. H. Bennett sent me the following interesting notes:—"Under the verandah of the homestead on Yandambah Station, near Booligal, New South Wales, a number of Fairy Martins' (*Lagenoplastes ariel*) nests were clustered together. One day I observed a pair of the Red-backed Kingfisher (*Todirhamphus pyrrhopygius*) perched on one of the rustic branches attached to a verandah post. Curious to know what was the object of the Kingfishers in coming to such an unusual place, I watched them and had not long to wait to ascertain the cause of their visit. The eggs and young birds contained in the Fairy Martins' nests were the attraction, and I was exceedingly interested in the manner in which the birds extracted them. One of the Kingfishers would fly up to a nest, and clinging to its rough sides, break off with its bill the neck

* Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. IV., p. 401 (1889).

of the structure, piece by piece. When tired with the exertion, the other would then take its place, and so on until the whole of the neck was broken away, and the eggs or young birds were reached which were quickly withdrawn and devoured. This was continued for some weeks, the Kingfishers coming every day for their meal.

"On the 14th November, 1800, while visiting a neighbour of ours near Yandambah Station, he informed me that a pair of Kingfishers had excavated a tunnel in one of the external clay and gravel walls of his house, close to a doorway in which the inmates were constantly passing and repassing. On my going out I found a pair of *Halcyon pyrrhopygius*, one of which was engaged in the work of tunnelling, whilst the other was sitting in close proximity; evidently the burrow was not completed."

"The Red-backed Kingfisher is a spring and summer visitant to Mossgiel, arriving as a rule in this district in September, and departing after the breeding season is over about the end of February. It prefers the most arid situations and is very seldom met with in the vicinity of water. The nesting sites here chosen are the sides of small dry tanks or old disused sawpits. In these situations it excavates a hole or burrow about two feet in length, and at the end forms a chamber, in which the eggs, four in number for a sitting, are deposited. In Victoria, where I have often found its nests, the burrows are formed in the pillars made by the White Ant."

From Broken Hill in South-western New South Wales, Dr. W. Macgillivray writes me:—" *Halcyon pyrrhopygius* goes north from here for the winter and returns early in spring. I have noted them once in August, but most of them return in September, and soon pair off for nesting. They do not frequent the Gum timber along the creeks but are birds of the open country where their plaintive piping call is frequently repeated from the top of a dry bush, from which point of vantage the bird keeps a sharp look out for any creeping thing that comes within range of its keen eyes. It is peculiar that these and other Kingfishers who find their living by the aid of their eyesight alone, very seldom notice an insect or other creature, so long as it keeps perfectly still, even when not protectively coloured it is not seen unless it moves.

"This Kingfisher usually chooses a steep bank of a creek or washaway to tunnel into when nesting time comes. The opening to the passage is usually round and about two and half inches in diameter and from this the passage slopes upward and backward for about twelve inches to the nesting chamber which usually measures about ten inches from front to back, eight inches from side to side, and six inches from floor to roof. The eggs usually five in number, rest on the powdered earth of the floor of the chamber. The usual nesting month is October, extending into November, though in a late season I have known young birds to be taken from the nest in February. They live well in captivity on a meat diet, and are very partial to beetles or insects of any kind. One cannot help remarking how like they are in all their ways to the "Laughing Jackass," any food given them is well beaten against the perch or side of a cage till soft then gulped down."

Mr. G. A. Keartland sends me the following note:—" *Halcyon pyrrhopygius* is occasionally seen in the northern portions of Victoria, especially near the Murray River. I observed it in various parts of Central Australia, and as far west as Geraldton in Western Australia, then north to the Fitzroy River. It is seldom seen in company, except at nesting time, when a pair, or parents and young, are occasionally met with. It frequents open forest country, and lives chiefly on lizards and grasshoppers, and seems to be quite indifferent to the presence of water."

From Adelaide, South Australia, Dr. A. M. Morgan sends me the following notes:—" *Halcyon pyrrhopygius* was the common species about Laura, where it took the place of *H. sanctus*, which did not occur there, but it is a summer visitor only. In October, 1895, a pair tried to nest in a sandpit quite close to the township, but were so often disturbed by boys that they gave

it up and left. I found a nest in the banks of Pine Creek, near Laura, on 2nd November, 1895, containing five fresh eggs. The hole was about four feet deep, and there was no nest. The male is slightly smaller than the female, and rather brighter in colour. I found a nest at Mt. Gunson, drilled in a bank amongst a number of White-breasted Swallows' nesting holes, which I attributed to this bird, as there was a dead young one directly beneath the entrance, the hole being empty. It never visits the Laura District later than February."

Mr. Tom Carter writes me from Western Australia:—" *Halcyon pyrrhopygius* was fairly common about creeks in the north-west, where its mournful whistle may be constantly heard in the spring months. One specimen I shot contained several scorpions of some considerable size. This bird was never seen on the coast."

For the purposes of breeding this species tunnels a hole, but there seems to be no choice whether it is in the side of a tank or sawpit, in a Termites' nest on a tree, or on the ground, or in the clay and gravel walls of a house, the eggs being deposited in an enlarged chamber at the extremity.

The eggs are four or five in number for a sitting, nearly round or rounded-oval in form, pure white, the shell being close-grained, smooth and slightly lustrous. A set of three taken at Wattoogoon, near Louth, by Mr. Edward Lord Ramsay, in October, 1887, measures:—Length (A) 1·03 × 0·85 inches; (B) 1·05 × 0·87 inches; (C) 1·03 × 0·93 inches. A very evenly-sized set of four taken by Mr. Charles Watson at Merungle Station, near Booligal, New South Wales, measures:—Length (A) 1·07 × 0·9 inches; (B) 1·07 × 0·91 inches; (C) 1·07 × 0·9 inches; (D) 1·07 × 0·92 inches. A set of five taken by Mr. H. G. Barnard at Bimbi, Duaringa, Queensland, on the 5th October, 1908, measure:—Length (A) 0·97 × 0·87 inches; (B) 0·97 × 0·88 inches; (C) 0·98 × 0·85 inches; (D) 0·98 × 0·87 inches; (E) 0·97 × 0·87 inches. A set of four taken by Mr. Barnard in the same locality, on the 11th October, 1908, measure:—Length (A) 1·07 × 0·88 inches; (B) 1·1 × 0·9 inches; (C) 1·09 × 0·93 inches; (D) 1·05 × 0·91 inches.

Young birds resemble the adults, but are very much duller in colour, the centres of the feathers on the crown of the head are blackish, and their margins pale brown; the upper wing-coverts and scapulars are dull blue, and broadly margined at the tips with very dull rust-red; there is also a rusty wash to the white feathers of the broad collar on the hind neck; the under parts are dull white, with narrow indistinct dusky fringes to the feathers on the fore neck; the remainder of the under surface is tinged with rusty-buff, which is more distinct on the lower sides of the body and the under tail-coverts. Wing 3·75 inches.

October and the three following months constituted the usual breeding season in Eastern Australia.

Halcyon sanctus.

SACRED KINGFISHER.

Halcyon sanctus, Vig. and Horsf., Trans. Linn. Soc., Vol. XV., p. 206 (1826); Gould, Bds. Austr., fol. Vol. II., pl. 21 (1848); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 267 (1892); *id.*, Hand-l. Bds., Vol. II., p. 60 (1900).

ADULT MALE—*Crown of the head and nape greenish-blue, on the latter a more or less well concealed white spot; brighter blue on the upper and posterior portion of the eye and sides of the nape; mantle and scapulars greenish-blue; back and rump blue, becoming slightly brighter on the upper tail-coverts; lesser wing-coverts greenish-blue, the remainder of the wing blue, blackish on the inner webs of all the quills, also on the apical portion of the outer primaries; tail blue: a supraloral streak rich ochraceous-buff; lores, a narrow line of feathers around the eye, fore-part of cheeks, the ear-coverts and a line of feathers ascending the nape black, the ear-coverts washed with dull greenish-blue; chin and throat whitish,*

the latter slightly washed with ochreous-buff; remainder of the under surface and a collar around the hind neck ochreous-buff, becoming slightly darker on the lower sides of the body and the under tail-coverts; bill blackish-brown, the under portion of basal half of the lower mandible fleshy-pearly-white; legs and feet fleshy-grey, the latter having a neat wash; iris dark brown. Total length in the flesh 8.25 inches, wing 3.7, tail 2.4, bill 1.5, tarsus 0.45.

ADULT FEMALE—Similar in plumage to the male.

Distribution—North-western Australia, Northern Territory of South Australia, Queensland, New South Wales, Victoria, South Australia, Western Australia, Tasmania.

WITH the exception of the central portion of the continent, I have examined specimens of the present species from nearly every part of Australia, also from Tasmania, and from many of the Pacific Islands. In the "Catalogue of Birds in the British Museum,"* Dr. R. Bowdler Sharpe records its ultra Australian range as "New Caledonia, the Solomon Islands and New Hebrides, throughout the Papuan Islands to the Moluccas, Celebes, Lombock, Java and Sumatra." In a species so widely distributed, it is not surprising to find there is a variation in size, also in the tints of plumage, especially of the under surface, some adult specimens being much paler, particularly those from very hot districts, than the adult male described on the preceding page. Of the birds obtained by Mr. G. A. Keartland at the Fitzroy River, North-western Australia in 1896-7, while a member of the Calvert Exploring Expedition, he remarks:†—"Their notes were not only totally different from those of the same species found in other parts of the continent, but the birds and their eggs were so much smaller as to suggest the possibility of a different species."

I can quite understand the difference in the vocal powers, for I have been misled myself by that of the common Black and White Fantail (*Sauvoprocta melaleuca*). About Sydney this species distinctly utters during the spring and summer months the words "Sweet Pretty Creature." At Moree, in Northern New South Wales, in November, 1897, I followed an unusual wary bird in open forest land for some time, although the "Sweet Pretty" was faintly uttered, it was impossible to syllabicate the remaining note. Ten years later near Brisbane, I noted that the call of *Sauvoprocta melaleuca* was the same as at Moree and on the Tweed River. The difference in size of *Halcyon sanctus* is no more than can be noted in birds procured in the same locality. The wing-measurement of the adult male procured by Mr. Keartland near the junction of the Fitzroy and Margaret Rivers, in North-western Australia, is 3.6 inches, of an adult male obtained by Mr. E. J. Cairn at Derby 3.7 inches, and of an adult male procured by me at Narrabri, on the Namoi River, New South Wales, in November 1896, only 3.5 inches. The wing of an adult male obtained at Dobroyde, Ashfield, near Sydney, in August 1897, measures 3.7 inches, and it is from this locality that the bird with the palest under surface in the Australian Museum collection was procured. It is remarkable that semi-adult specimens have a greater wing-measurement than adult birds, that of a semi-adult female obtained by Dr. E. P. Ramsay at Kingswood, thirty three miles west of Sydney, measuring 3.8 inches. This is an abnormally plumaged specimen, having the crown of the head, nape, mantle and scapulars dingy-black, with a faint olive-green wash on the nape and scapulars; chin and throat white, remainder of the under surface and collar around the hind neck pale ochreous-buff, slightly darker on the sides of the body, all the feathers being narrowly fringed with dull black.

The Sacred Kingfisher is freely distributed in the spring and summer months throughout Eastern Australia. In the neighbourhood of Sydney it is more commonly met with during the latter end of August or beginning of September, until the middle of March, but I have observed odd birds or pairs throughout the autumn and winter months. Near the coast it chiefly frequents open forest lands, and the taller trees of the brushes and scrubs, and I have found it nesting in the decaying and hollow trunks or branches of trees growing close to sea beaches. Inland,

* Cat. Bds. Brit. Mus., Vol. XVII., p. 269 (1892). † Trans. Roy. Soc. S. A., Vol. XXII., p. 134 (1898).

although it may often be seen far away from permanent water, it evinces a decided preference for the neighbourhood of dams, creeks, and rivers. Sometimes it may be seen in the parks and gardens of Sydney and the suburbs, and I have also noted solitary examples in the large native Fig-trees in the Museum grounds during the hot summer months. On the 21st January, 1897, while proceeding to town by train, I saw one in a most unusual place. It was perched on a semaphore, which stood amid a net-work of railway lines near the then metropolitan terminus at Redfern.

Its tell-tale and somewhat peevish note, which is sometimes uttered throughout the night, soon indicates its presence, and when one is near the nesting place of a pair of these birds, they emit harsh cries of displeasure, and frequently at the same time dash down at the intruder.

The food of this species consists chiefly of small lizards and fish, crickets, grasshoppers and other insects and their larvæ, and both fresh and salt-water crustaceans.

Mr. H. G. Barnard writes me from Duaringa, Dawson River, Queensland :—" *Halcyon sanctus* is always here, but is more plentiful in the spring months. It breeds in holes in the Termites' nests in trees. The eggs are four to six in number for a sitting, and the breeding season lasts from October to December."

While resident at Mossgiel, New South Wales, the late Mr. K. H. Bennett wrote me as follows :—" *Halcyon sanctus* is a regular summer visitant to this locality, but is nowhere numerous. It arrives as a rule in September, and departs again about the end of February, its stay being in a great measure influenced by the season. Although it is sometimes found in waterless country, it evinces a decided preference for swamps and water-courses. It preys upon lizards, frogs, fish, crayfish and insects. It breeds here from October to January, its nest being placed in some hollow branch or trunk of a tree, and usually near water."

Mr. George Savidge sends me the following notes from Copmanhurst, on the Upper Clarence River, New South Wales :—" *Halcyon sanctus* is not so plentifully dispersed in this district as *H. macleayi*. It usually lays four eggs, slightly larger than *H. macleayi*. The nest is usually in a Termites' nest, or very often in a hollow limb of a *Encalyptus*."

Mr. G. A. Keartland sends me the following note :—" *Halcyon sanctus*, when found near rivers or watercourses, usually make holes in the banks in which to nest, while those seen in the forests far away from water lay their eggs in holes in hollow branches. There is a small heavily-timbered paddock at Brighton, Victoria, in which two or three pairs breed every season, and from one nest I took five eggs in October, 1890. Along the course of the Yarra River, from Alphington to Heidelberg, I have seen many nests in the river banks. Lizards, insects, &c., constitute their chief food."

Mr. Edwin Ashby writes me from Blackwood, South Australia :—" *Halcyon sanctus* is the common Kingfisher of South Australia and Victoria, especially in the hilly timbered country. This species feeds on grasshoppers, beetles, &c., and nests in hollow limbs of trees. I have a specimen with rather pale plumage from Port Keats, in the Northern Territory of South Australia."

Dr. A. M. Morgan writes me :—" *Halcyon sanctus* is still quite a common bird in and about Adelaide. A pair or two are always to be found in the Botanic Gardens, and on the banks of the Torrens they are more numerous in the summer, but a few remain throughout the year. I have found numerous nests on the banks of the Torrens, near the Reed Beds, but as I have never disturbed them I cannot give you any particulars. They do not always breed in banks; in the Mt. Lofty ranges they drill a hole in a rotten branch of a tree, generally some distance from the ground, and I have noticed them doing the same thing at the Finnis, where they could have used a bank if they had chosen to do so. Both birds assist in drilling the hole, and the pieces of rotten wood are carried some little distance before being dropped. They breed in November and December. This year, 1907, I saw young birds just from the nest at the end of January."

From Broome Hill, South-western Australia, Mr. Tom Carter sends me the following notes:—" *Halcyon sanctus* was only twice observed at Pt. Cloates, in the north-west, and on both occasions in February in different years. Possibly the birds were migratory, as they were close to the beach. It was common on the Vasse River and other parts of the south-west. About Broome Hill they appear in the spring, and after rearing their young leave the district until the following season. In 1905 the first bird was observed here on the 2nd October; and on the 22nd January, 1906, a pair of old birds were feeding their fledged young with tadpoles, caught in a stock tank; on the 22nd February, 1906, a quite recently fledged bird was caught; and on the 4th November, 1906, four fresh eggs were seen in a nest."

No species of Australian Kingfisher chooses more varied nesting sites than the present species. The first nesting place I ever found was in a hole in the branch of a tree, in Albert Park, near Melbourne. It was eighty feet from the ground, and the eggs, five in number, were simply laid on the decaying wood and dust usually found in one of these cavities. All the nesting places I found in Victoria, some as low down as six feet, were in similar situations, or in tree stumps. In New South Wales I found but comparatively few in holes or hollow limbs of trees, nearly all of the birds I found breeding forming a tunnel in a White Ant's nest, and laying the eggs in an enlarged chamber at the terminus. Both sexes assist in the work of excavation, and in some chambers I have found the eggs laid on a few small cast fish bones, or on the wing-cases of beetles, less in quantity, but similar to that found in the egg chambers at the end of burrows of *Alysiene azurea*. Gould remarks about *Halcyon sanctus* excavating holes in Termites' nests, on trees, in search of and for food, but he was not apparently aware that these burrows were utilized as nesting sites. At Dobroyde, Ashfield, where I used to live, and this species used to be plentiful, I have seen very large nests of these Termites drilled in all directions, and in some instances completely through the mound; other nests have been so small and shallow, standing out only a few inches from the trunk, that the birds soon reached the bark of the tree, progress was stopped, and frequently the burrow was abandoned, but in several instances the birds continued their excavating in a downward way close to the bark, and there formed the chamber. As a rule the tunnel inclines upwards before entering the chamber. On the 17th November, 1907, I observed a pair of these birds alternately relieving one another in the labour of forming a tunnel in a Stag-horn fern, which was attached about ten feet from the ground to the trunk of a tree, growing near one of the side entrances to Government House, and leading into the Botanic Gardens, Brisbane. At Canterbury, near Sydney, I have taken eggs from a tunnel in the ground, in the side of a grass-lined hole where a tree stump had formerly been dug out. Mr. E. H. Lane also informs me that he has taken the eggs of this species in a similar situation. At Eastwood I saw a set of five fresh eggs that was taken by a boy from a small hollow in the centre of a very thick ten feet sawn log, that had been lying on the ground for some time, the female also being captured in this unusual nesting place. At Narrabeen Mr. C. G. Johnston found five young ones in a burrow in a Termites' nest, which was built around the top of a post of a rough three-railed fence, while at Roseville a pair of these birds resorted for several years to a large Termites' nest at the top of one of the highest branches of a large dead gum tree near one of the main thoroughfares, and fully one hundred and twenty feet from the ground.

The eggs are rounded oval in form, pure white, the shell being close-grained, smooth and usually lustrous. A set of five taken at Canterbury, New South Wales, on the 1st December, 1892, from a tunnel in the side of a large hole in the ground, measures:—Length (A) 1·07 × 0·87 inches; (B) 1·03 × 0·9 inches; (C) 1·05 × 0·88 inches; (D) 1·03 × 0·91 inches; (E) 1·07 × 0·89 inches. A set of five taken at Roseville out of a hollow branch of a tree, on the 3rd October, 1901, measures:—Length (A) 1·09 × 0·88 inches; (B) 1·07 × 0·88 inches; (C) 1·06 × 0·9 inches; (D) 1·08 × 0·9 inches; (E) 1·05 × 0·89 inches. I have noted that as a rule eggs laid in a Termites' nest often lose their lustre.

Fledgelings resemble the adults, but are much duller in colour on the upper parts, centre of crown of the head and mantle blackish; wings dull blue, all the upper wing-coverts and feathers on the forehead broadly margined with pale ochreous-buff; all the under surface white, the feathers on the chest having narrow dull blackish margins, sides of the body and the under tail-coverts washed with ochreous-buff. Wing 3·1 inches.

A pair of these birds breed regularly every season in a tree at the back of my house at Roseville. On the 10th November, 1901, I saw four young ones being fed by their parents at the entrance of a hollow spout of a gum tree eighty feet from the ground. On the same day I saw a Sacred Kingfisher, with a lizard in its bill, fly to the entrance of a burrow in a 'Termites' nest, and heard the noise of young ones as the old bird disappeared in the mound. A brood of four young ones left the same nesting-place on the 9th November, 1900.

October and the four following months constitute the usual breeding season in the neighbourhood of Sydney, fresh eggs being usually found about the end of October, and again at the latter end of December, or early in January, and two broods being reared during the breeding season.

Halcyon sordidus.

MANGROVE KINGFISHER.

Halcyon sordidus, Gould, Proc. Zool. Soc., 1842, p. 72; *id.*, Bds. Austr., fol. Vol. II., pl. 23, (1848); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 278 (1892); North, Proc. Linn. Soc. N. S. Wales, Vol. VII., (Ser. 2nd) p. 395 (1892); Sharpe, Hand-l. Bds., Vol. II., p. 60 (1900).

ADULT MALE—*Forehead dusky-brown: sinciput, crown of the head, nape, lesser, and median wing-coverts and scapulars dull olive-green; rump and upper tail-coverts greenish-blue: greater-coverts and quills blackish, the exposed portion ultramarine-blue; tail ultramarine-blue; a longitudinal streak whitish; feathers around the eye, sides of face, and a broad line continuing around the crown of the head dull black, followed by a broad white collar around the hind neck, which is separated from the dull olive-green feathers of the mantle by an indistinct line of black; sides of neck and all the under surface and under tail-coverts white, some of the feathers on the sides of the breast narrowly fringed with black; bill (of skin) brownish-black; the basal half of the under side of the lower mandible yellowish-white; legs and feet dark brown. Total length 9·5 inches, wing 4, tail 3, bill 1·65, tarsus 0·65.*

ADULT FEMALE—*Similar in plumage to the male.*

Distribution—North-western Australia, Northern Territory of South Australia, Queensland.

THE Mangrove Kingfisher, exceeding all other Australian members of the genus *Halcyon* in size, inhabits the mangrove-lined mouths of the rivers and creeks of North-western Australia, the Northern Territory of South Australia, and Queensland; its range also extends to the Aru Islands and those of the Louisiade Group. It never ventures far inland, but is restricted in its habitat to those estuarine areas and salt-water creeks and marshes of the coast which are clothed with a dense growth of mangroves. In these secure haunts it obtains its food, which consists principally of small fish and crustaceans.

All the specimens in the Australian Museum collection are from the Brisbane River, and Moreton Bay in South-eastern Queensland.

While resident at Point Cloates, North-western Australia, Mr. Tom Carter sent me a skin of this species for examination, and wrote:—"These birds are not uncommon about the beach at Point Cloates from December until April. A bird was seen at a high sandstone cliff on the 15th June, and a pair of birds on the 1st September. These are my only records for winter months."

Mr. Frank Hislop writes me:—"Halcyon sordidus is generally seen about the mud-flats and banks of the Bloomfield River, North-eastern Queensland. They live on small fish and small crabs which swarm over the mud and sand banks at low tide. I have never found the breeding-place of this species."

Nothing had been recorded of the nesting-place or eggs of the Mangrove Kingfisher, until Mr. J. A. Boyd found this species breeding on Hinchinbrook Island in October 1892. He kindly forwarded me a set of eggs, which I described and exhibited at the November meeting of the Linnean Society of New South Wales,* in the same year. Relative to the taking of them Mr. Boyd sent me the following interesting notes.—"While on a trip to Hinchinbrook Island, I was camped in the beginning of October 1892, on a ridge, which, intersecting the forest of mangrove, ran down to a salt-water creek about two miles from the sea. On several consecutive days I had noticed a Kingfisher (*Halcyon sordidus*) settle on the limb of a tree that had fallen into the creek, and stay there some little time picking and pluming herself. As she always came from and returned in the same direction, I concluded that she was breeding, and on the 6th instant I traced her to a Termites' nest in a Blood-wood Tree (*Eucalyptus corymbosa*) about thirty feet from the ground and leaning somewhat over the water. The tree was two feet and a half at the base, and the ant's nest, not a large one, projecting only about twenty inches from the limb on which it was placed, I sent up a blackfellow, and he brought down three eggs, two of which were slightly incubated, and reported there was no made nest, the eggs being simply laid on the bare substance of the ant-heap at the end of the burrow. I did not notice the male bird near the nest, but heard him calling from a mangrove island about two hundred yards away. I saw another pair nearer the coast, but though I searched on several occasions, failed to discover their breeding-place."

The above set of eggs are pure white, and nearly round in form, the shell being very smooth and nearly lustreless, and partaking less of that glossy pearly-whiteness characteristic of the known eggs of all the other members of the Australian Alcedinidæ. Length (A) 1.23 × 1.03 inches; (B) 1.2 × 1.03 inches; (C) 1.22 × 1.05 inches. Mr. Boyd when subsequently in Sydney, informed me that on the 26th December following, he again visited the nest of *Halcyon sordidus*, in company with a black boy, who in climbing the tree reported that "two fellow egg sit down." These eggs were quite fresh, and were evidently laid by the same bird that had been robbed in October, although the burrow in the Termites' nest had been roughly broken into with a tomahawk. On this occasion one bird was flushed out of the nesting-place, and the other was in a tree near at hand. The eggs are similar to those previously taken, and measure as follows:—Length (A) 1.24 × 1.03 inches; (B) 1.27 × 1.03 inches.

Judging by the dates on which Mr. Boyd took the above sets of eggs, October and the three following months would appear to constitute the breeding season of this species.

Genus TANYSIPTERA, *Figors.*

Tanysiptera sylvia.

WHITE-TAILED KINGFISHER.

Tanysiptera sylvia, Gould, Proc. Zool. Soc., 1850, p. 200; *id.*, Hand-bk. Bds. Austr., Vol. I., p. 137 (1865); *id.*, Bds. Austr., fol. Vol. Suppl., pl. 6 (1869); Sharpe, Cat. Bds. Brit. Mus., Vol. XVII., p. 300 (1892); *id.*, Hand-l. Bds., Vol. II., p. 62 (1900).

ADULT MALE—Loves, sides of the face, hind neck and upper portion of the back black, the latter with a white patch in the centre; lower back, rump and upper tail-coverts and wings ultramarine-blue, the outer primaries with a faint greenish tinge on their outer webs, inner webs and tips of most

* Proc. Linn. Soc. N. S. Wales, 2nd Ser., Vol. VII., p. 395 (1892).

of the quills blackish; central pair of tail-feathers white, the remainder blue, the lateral feathers blackish on their inner webs, the outer feather on either side blackish, except a slight bluish wash on the apical portion of the outer web; crown of the head deep ultramarine-blue in the centre, passing into brighter blue on the sides of the head and nape; all the under surface, under tail, and under wing-coverts rich cinnamon colour, paler on the latter and the centre of the throat; bill sealing-wax red; legs and feet sealing-wax red. Total length 13 inches, wing 3.8, central tail feathers 7.75, next on either side 2.8, bill 1.2, tarsus 0.55.

ADULT FEMALE—Resembles the male, but is duller in colour, the spot on the back is tinged with buff, and the central pair of white tail-feathers, which are shorter, have the basal portion of their outer webs blue, except near the shaft.

Distribution—North-eastern Queensland.

THE White-tailed Kingfisher is a spring and early summer migrant to the coastal districts of North-eastern Queensland, and after the breeding season is over apparently leaves the mainland at the end of March. In the "Proceedings of the Royal Society of Queensland" * on the "Migration of Birds at the Cape York, Peninsula," Mr. K. Broadbent remarks:—" *Tanysiptera sylvia* have all left here by the end of March. Mr. F. L. Jardine informs me that in the month of October, during the early morning, he has met with them here in hundreds, so tired and enfeebled by their migration as to refuse to fly out of harm's way, and that on the day previous to this visitation they were nowhere to be seen."

Although observers along the Northern Queensland Coast, from Cape York south to Ingham, near the mouth of the Herbert River, are unanimous that it is a strictly migratory species, I have never seen it recorded, nor does anyone I have questioned seem to know, the northward limit of its range after leaving Australia, nor from whence it comes and whither it returns; but probably it is to one of the larger islands of Torres Strait, for it does not occur in New Guinea, even at Port Moresby in the south-eastern part of that island, and where it is represented by its slightly smaller and closely allied congener, *Tanysiptera salvadoriana*, Ramsay.

In Australia it is exclusively an inhabitant of the belt of rich tropical vegetation situated on the north-eastern coast of Queensland, and is never found in the dry open country inland.

The late Mr. J. A. Thorpe, who spent seventeen months collecting on the Cape York Peninsula, and principally in the neighbourhood of Somerset, informed me that the favourite haunts of these lovely plumaged birds were the open spaces beneath the wide-spreading branches of the trees selected by large colonies of *Calornis metallica*, as nesting-sites. In that locality he found them breeding during October. They tunnel a hole in the low ant hills, which are composed chiefly of rich black soil, and found only in the dense scrubs. Near the extremity of the tunnel a chamber is hollowed out for the reception of the eggs. He also informed me that he had never found these birds breeding in the large clay mounds of the Termites in the adjacent open country, or met with them out of the scrubs. Females procured while nesting have the lengthened tail feathers much abraded.

Mr. Frank Hislop sends me the following note:—"In the Bloomfield River District, North-eastern Queensland, *Tanysiptera sylvia* arrives early in November and commences to breed almost at once, and leaves again about the end of February soon after it is over. They make their burrows in Termites' mounds on the ground, in the scrubs, and usually lay four eggs. The native name of this bird is "Tchewal-tchewal."

Writing me in 1905 from Hambleton Plantation near Cairns, Mr. A. F. Smith, remarks:—" *Tanysiptera sylvia* arrived earlier this year; I heard a number in the scrub and saw two on the 17th November. Last year they were nearly a month later, I saw the first of them on the 15th

* Proc. Roy. Soc. Qld., Vol. I., p. 94 (1884).

December, 1904. They do not keep to the main scrub to breed as they did last year, as I found several of their tunnels in small patches of scrub, one was in an ants' nest on the bank of a creek, the scrub about it being similar to what was growing on the steep banks. The surrounding country was open forest, and the main scrub was on the hills a mile away. I see that Mr. J. A. Thorpe found them breeding at Cape York, digging a tunnel about fifteen inches in length, in a Termites' nest a few feet from the ground. It is only a minor point, but they could not do that here, as the ants' nests in the scrub are only about eighteen inches high and a foot in width. I found six of their tunnels on the 15th January, 1905. All the sets I took contained three eggs in each, and they were all more or less incubated. In each instance the tunnel was about the middle of the ants' mound and faced down hill. It would seem that the sitting bird has to forage for itself, as four of the sets, although not quite cold, had evidently not been sat on for some time, and the birds did not show themselves. The fifth set was quite warm and the bird perched on a tree alongside, as I dug out the nest. The time of day does not seem to make any difference, as two of the tunnels were dug out about 11 a.m., two about 4:20 p.m., and the fifth at 12:30 p.m. Another tunnel contained young birds. *Tanysiptera sylvia* is a regular visitor here in the wet season, appearing in November or December, remaining to breed, then going away."

While resident at Ripple Creek, Herbert River, Mr. J. A. Boyd wrote me as follows:—"In Dr. Ramsay's 'Tabular List of Australian Birds,' Port Denison is included in the habitat of *Tanysiptera sylvia*, but I have never seen it here in the Herbert River District; they come as far south as Dalrymple's Gap, which seems to be about their southern limit." Subsequently, however, Mr. Boyd forwarded me two eggs of a set of four, taken on Ripple Creek Sugar Plantation, and Mr. A. F. Smith also noted them at Ingham, near the mouth of the Herbert River.

Messrs. E. J. Cairn and Robert Grant procured this species while collecting on behalf of the Trustees of the Australian Museum, near Cairns, Queensland, and the latter has given me the following notes:—" *Tanysiptera sylvia* although nowhere numerous, we found in pairs all through the coastal scrubs and especially in the vicinity of creeks, each pair seeming to have a chosen haunt of its own. It is a very pretty sight to see them fly across an open part of the scrub, when their coral-red bills and the long white feathers of their tail show to advantage. Their cry is not unlike that of *Halcyon sanctus*. I saw a pair of these birds flying backwards and forwards to a Termites' nest, not on the ground, but high up in a tree. As I presumed they were nesting in it, I did not disturb them. The stomachs examined contained principally the remains of beetles and other insects. We did not meet with this species on the mountain ranges."

Mr. H. G. Barnard, of Bimbi, Duarina, Queensland, sends me the following note:—"When collecting on Cape York Peninsula in 1896 and 1897, I found *Tanysiptera sylvia* in large numbers. They arrive at Somerset about the end of October and all through November in hundreds. In conversation with members of the Pearling Fleets, who have splendid opportunities of observing the flight across Torres Strait to the mainland, they told me that for weeks, and all day long, different species of birds were seen in flocks and singly, battling their way across. Large numbers of them, when tired, especially the Kingfishers, fly close to the water and get wet with the spray and fall into the sea. I was informed the death rate from this cause alone must be enormous. That great numbers reach the land safely the following will shew:—In fourteen days I took thirty five nests, each containing a full set of three eggs. The White-tailed Kingfisher breeds in the Termites' mounds, only in the scrubs, not in the forest country, both on the ground and in the trees. They commence to breed towards the end of November, the breeding season continuing until the end of February. In April hardly a bird is left by the end of that month."

From the preceding notes it may be gathered that for the purposes of breeding, although it usually tunnels a hole in a small Termites' nest on the ground and deposits its eggs in an

enlarged chamber near the end, it sometimes resorts to a Termites' nest on the trunk or branch of a tree some forty or fifty feet from the ground.

The eggs are usually three, sometimes four in number for a sitting, almost globular in form, pure white, the shell being close-grained, smooth and usually lustrous. A set of four taken by Mr. Frank Hislop near Wyalla, on the Bloomfield River, on the 21st December, 1894, measures:—Length (A) 1×0.92 inches; (B) 1.04×0.93 inches; (C) 1.04×0.9 inches; (D) 1.03×0.9 inches. Two eggs of a set of four taken at Ripple Creek, Herbert River, measure:—Length (A) 1.09×0.9 inches; (B) 1×0.86 inches.

Young birds resemble the adults but are much duller in plumage; scapulars and feathers on back black, the latter with indistinct dull blue tips, with an irregular-shaped ochreous patch in the centre of the upper back; wings dull blue, blackish on the inner webs and tips of the quills, with rich ochreous tips to the upper wing-coverts; upper tail-coverts white edged with blue; all the under surface tawny-buff; whitish on the throat; the feathers on the breast with narrow blackish edges.

November and the three following months constitute the usual breeding season of the White-tailed Kingfisher in North-eastern Australia.

EXPLANATION OF PLATE A. 13.

Nesting-site of the Brown Kingfisher (*Dacelo gigas*) in Termites' nest on tree.



EXPLANATION OF PLATE B XII.

- Figs. 1, 2. *CORCORAX MELANORHAMPHUS*.
White-winged Chough.
- Figs. 3, 4. *RALLINA TRICOLOR*.
Red-necked Rail.
- Figs. 5, 6. *EULADEORNIS CASTANEIVENTRIS*.
Chestnut-bellied Rail.
- Figs. 7, 8. *HYPOTENIDIA PHILIPPENSIS*.
Pectoral Rail.
- Fig. 9. *HYPOTENIDIA BRACHYPUS*.
Lewin's Water-Rail.
- Figs. 10, 11. *PITTA STREPITANS*.
Noisy Pitta.
- Figs. 12, 13. *CINCLOSOMA PUNCTATUM*.
Spotted Ground-Thrush.
- Figs. 14, 15. *PITTA SIMILIMA*.
Lesser Pitta.
- Figs. 16, 17, 18. *PITTA MACKLOTI*.
Macklot's Pitta.
- Figs. 19, 20. *CINCLOSOMA CASTANONOTUM*.
Chestnut-backed Ground-Thrush.
- Figs. 21, 22. *PSOPHODES CREPITANS*.
Whip-bird.
- Fig. 23. *PSOPHODES NIGRIGULARIS*.
Western Whip-bird.
- Fig. 24. *CALORNIS METALLICA*.
Shining Calornis.
- Fig. 25. *SPHENOSTOMA CRISTATA*.
Crested Wedge-bill.



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EXPLANATION OF PLATE B. XIII.

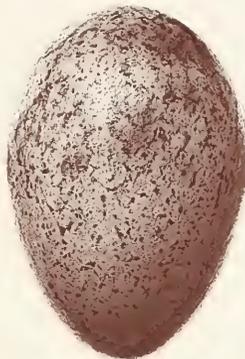
Figs. 1, 2, 3, 4. *MENURA SUPERBA*.
Lyre-bird.

Figs. 5 and 9. *MENURA ALBERTI*.
Prince Albert's Lyre-bird.

Figs. 6, 7, 8. *MENURA VICTORLE*.
Queen Victoria's Lyre-bird



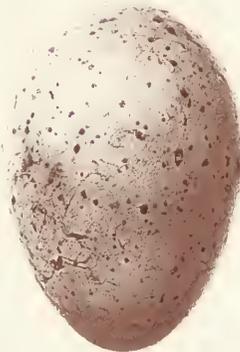
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NESTS AND EGGS OF BIRDS

FOUND BREEDING

IN

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BY

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