

SHORT COMMUNICATIONS

THE TONGUES OF EPHTHIANURA AND ASHBYIA

Results of the Harold Hall Australian Expedition, No. 31.

The previous number in this series appeared in Emu 66: 319-336.

The subfamily Malurinae (Sylviidae) as defined by Mayr and Amadon (1951) comprises an assemblage of small warbler-like species occurring in Australia, New Guinea, New Zealand and the Pacific. Subsequent studies have suggested this assemblage is polyphyletic. The genera *Clytomyias*, *Chenorhamphus*, *Todopsis*, *Malurus*, *Stipiturus* and *Amytornis* differ from the remainder of the Malurinae *sensu* Mayr and Amadon in having a gap in the spinal feather-tract, in the interscapular zone (Harrison 1969; see also Parsons 1968: 23), and may (Sibley 1970) or may not (Harrison and Parker 1965; Harrison *op. cit.*) be referable to the Sylviidae. Electrophoretic patterns of the egg-white proteins of *Acanthiza* suggest that this too may be unrelated to the Sylviidae (Sibley *op. cit.*).

This leaves a heterogeneous assemblage of some twenty genera whose affinities are equally uncertain. Of these, *Ephthianura* and *Ashbyia*, the Australian chats, have sometimes been placed as a separate family, the Ephthianuridae (RAOU Checklist 1926; Serventy and Whittell 1967; Condon 1968-9). The present note draws attention to the fact that the species of *Ephthianura* have brush-tipped tongues, a condition not previously noted for this group.

Sibley (1970: 73) found the electrophoretic pattern shown by the albumen of *E. tricolor* 'similar to that of the sylviids but even more like the *Meliphaga* type of pattern . . . This poses a question similar to that presented by *Acanthiza*, namely, is it possible that *Ephthianura* [*sic*] is more closely related to *Meliphaga* than to *Sylvia*?'

Rand (1967: 58), discussing the tongues of nectarivorous birds, stated of the Meliphagidae: ' . . . the predominate pattern is to have the tip split into four parts, each of which is frayed along one margin. However, one species [*sic*] with a much simpler tongue is known, *Melipotes*, of New Guinea (Scharnke, 1933, p. 355), though it still shows a rudimentary four-parted tip. Probably this is degenerate following a switch to a predominately berry diet.' Of the vexing South African genus *Promerops*, whose affinity to the honeyeaters is in doubt, Rand remarked: 'There is one feature in the *Promerops* tongue that is rather different from any Meliphagidae I have examined or seen figured. Only the two outer parts

of the tip are frayed to give the brush tip. The two centered elements are not frayed and appear as if modified for probing.' This is contradicted by Rand's drawing of the tongue of *Promerops*, however, in which the two central elements are depicted as having frayed tips.

In 1966, examining tongues collected by the Harold Hall Australian Expedition and preserved in alcohol, I noticed that those of the Crimson Chat *Ephthianura tricolor* and the Orange Chat *E. aurifrons* were brush-tipped. With the acquisition of three tongues of the Yellow Chat *E. crocea* in January 1972 I have now examined the tongues of all five species of Australian chats. Those of *tricolor*, *aurifrons* and *crocea* are basically similar (Fig. 1), consisting of an inner pair of elements that are single-pointed (*aurifrons*), double-pointed (*tricolor*) or brushed (*crocea*) at the tip, supplemented by a more delicate outer pair of fringes that arise from a flange at the base of each inner element (*tricolor*, *crocea*) or are modified into a pair of separate outer elements (*aurifrons*). The tongue of the White-fronted Chat *E. albifrons* is less finely divided at the tip. That of the Gibber Chat *Ashbyia lovensis* is much simpler, with three small notches at the tip. I have observed the Crimson Chat inserting its bill into the flowers of the legume *Brachysema chambersii*, which contained much nectar and were structurally suited to pollination by birds. I have also watched this chat probing the flowers of *Eremophila bowmanii* that contained small insects but no nectar. A study of the feeding habits of the chats in relation to the structure of their tongues would prove most useful.

The eggs of *Ephthianura* and *Ashbyia*, with their white or creamy ground and sparse markings of purplish black, brownish black, reddish brown and orange-brown, are strikingly similar to those of some Meliphagidae. For example, some eggs of *E. tricolor* and *aurifrons* match closely eggs of *Ramsayornis modestus*, *Phylidonyris albifrons* and *P. melanops*; eggs of *Ashbyia lovensis* resemble those of *Meliphaga penicillata* and *M. cratitia*; and some eggs of *E. albifrons* are like those of *Meliphaga lewini*, though smaller.

The tongues of *E. tricolor*, *aurifrons*, and *crocea* approach most closely the quadripartite type de-

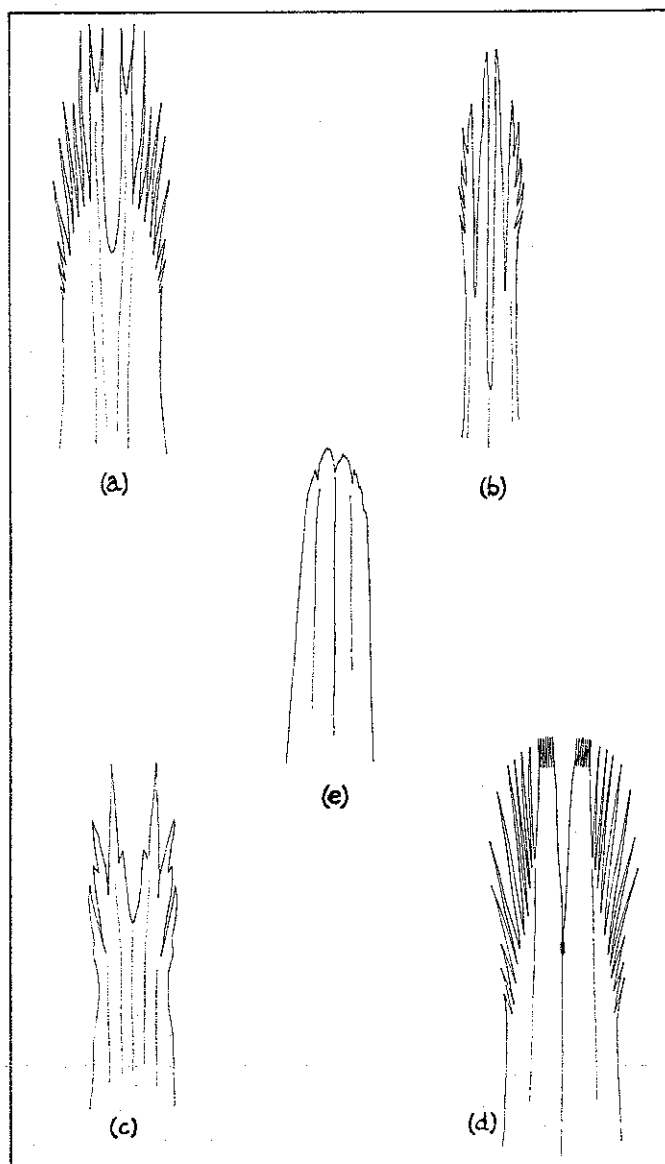


Figure 1. Tongues of (a) *E. tricolor*, (b) *E. aurifrons*, (c) *E. albifrons*, (d) *E. crocea* and (e) *A. lovensis*.

scribed and figured by Rand for the Meliphagidae and *Promerops*. Those of *E. albifrons* and *A. lovensis*

may represent states of secondary simplification, as was suggested by Rand in the case of *Melipotēs*. Because in nectarivorous birds the brush-tongue seems to have evolved independently at least nine times (Rand *op. cit.*; McKean 1969) it would be unwise to associate the Australian chats with the honeyeaters on this character alone. The similarity between the eggs of chats and honeyeaters, and Sibley's comment on the electrophoretic pattern of the egg-white proteins of the Crimson Chat, however, do support the possibility of such an association. For the present it may be best merely to regard the Australian chats as a separate family, the Ephthianuridae, of uncertain affinities.

My thanks are due to Dr C. J. O. Harrison, Prof. C. Sibley and Dr G. M. Storr for valuable comments and suggestions.

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4 April 1972.

BIRDS OF THE OPALTON AREA (23°15'S, 142°30'E)

Because the birds of the Opalton area, about 110 km south of Winton and about 190 km west of Longreach in central western Queensland, are poorly known, it is worth recording all species found there by myself and different companions during three visits since mid-1970. On 28–29 June 1970 I was there with Brig. H. R. Officer, when the countryside was extremely dry. From 26 to 28 September 1970 Miss A. Griffin and I were there, while the area was still suffering from a most severe drought (Griffin 1971). From 11 to 14 September 1971 I again visited the place with Brig. Officer and my son, Keith, but this time after the drought had broken and when birds were more plentiful.

To economize space in the following list, the records attributable to each visit are designated A, B and C respectively. It may be assumed that if no locality is given the record is for Opalton, and that 'km north (east)' means north (east) of Opalton. W–O means between Winton and Opalton.

DROMAIUS NOVAEHOLLANDIAE Emu. C, three within 40 km.
MILVUS MIGRANS Black Kite. B, one; few regularly over Winton; two W–O.
HALIASTUR SPHENURUS Whistling Kite. B, seen W–O. C, noted 65 km north.
AQUILA AUDAX Wedge-tailed Eagle. B, four at carcass 70 km north.
CIRCUS ASSIMILIS Spotted Harrier. B, one 55 km north.
FALCO BERIGORA Brown Falcon. B, one; one W–O.
FALCO CENCHROIDES Nankeen Kestrel. A, two 80 km north. B, two W–O. C, one.
GRUS RUBICUNDUS Brolga. B, two 50 km north.
ARDEOTIS AUSTRALIS Australian Bustard. B, one. C, one 10 km east.
GLAREOLA ISABELLA Australian Pratincole. B, one W–O. C, 20 W–O.
GEOPELIA STRIATA Peaceful Dove. C, two pairs.
GEOPELIA CUNEATA Diamond Dove. B and C, nests found with young.
PHAPS CHALCOPERA Common Bronzewing. B, nest with eggs. C, 3 pairs.
LOPHOPHAPS PLUMIFERA Plumed Pigeon. B, 14, display seen. C, 6 pairs.
OCYPHAPS LOPHOTES Crested Pigeon. A, sparse W–O. B, four pairs W–O. C, two singly 80 km north.
CACATUA ROSEICAPILLA Galah. A, in pairs W–O. B, five pairs 50 km north. C, small flocks W–O; one regularly Opalton.
NYMPHICUS HOLLANDICUS Cockatiel. B, small flocks W–O. C, four regularly.
BARNARDIUS BARNARDI Ringneck Parrot. B, pair 90 km north; three pairs farther south; pair Opalton. C, many pairs, all with obvious red frontal band; three young unable to fly attended by four adults.
MELOPSITTACUS UNDULATUS Budgerygah. A, few small flocks, W–O. C, common in small flocks.

CUCULUS PALLIDUS Pallid Cuckoo. C, pair.
CHRYSOCCOCCYX BASALIS Horsfield Bronze Cuckoo. B, one seen and heard. C, young bird being fed by Red-capped Robin 95 km north.
NINOX NOVAESEELANDIAE Boobook Owl. B and C, calls heard.
AEGOTHELES CRISTATUS Owlet-Nightjar. B and C, seen and heard.
EUROSTOPODUS GUTTATUS Spotted Nightjar [B, one possible.] C, calls frequent, pair seen.
HALCYON PYRRHOPYGIA Red-backed Kingfisher. B, one 80 km north. C, four 90 km north; pair Opalton.
MEROPS ORNATUS Rainbowbird. B, pairs 55 and 65 km north. C, not uncommon Winton.
PETROCHELIDON ARIEL Fairy Martin. C, plentiful just south of Winton.
PTEROPODOCYS MAXIMA Ground Cuckoo-Shrike. B, two 40 km north.
CORACINA NOVAEHOLLANDIAE Black-faced Cuckoo-Shrike. A, B and C, single birds fairly regularly.
LALAGE SUEURII White-winged Triller. B and C, few Opalton and W–O.
POMATOSTOMUS TEMPORALIS B, parties 10 and 55 km south. These birds had characteristics of race *intermedius*.
POMATOSTOMUS HALLI Hall's Babbler. B, at least one party seen several times in dense acacia-scrub, building. C, five separate parties; seen 20 km south of Winton.
CINCLORHAMPHUS MATHEWSI Rufous Songlark. C, seen.
EPHTHIANURA TRICOLOR Crimson Chat. B. ♂.
SMICRORNIS BREVIROSTRIS Weebill. A, B and C, noted. Had characteristic of race *flavescens*.
ACANTHIZA CHRYSORRHOA Yellow-tailed Thornbill. A, 85 km north. B and C, party 90 km north.
ACANTHIZA UROPYGIALIS Chestnut-tailed Thornbill. A and B, occasionally seen from 20 km south of Winton to Opalton. Previously not recorded in Queensland farther north than Charleville, 475 km south-east.
ACANTHIZA APICALIS Broad-tailed Thornbill. A, B and C, not uncommon from 20 km south of Winton to Opalton. Recognized as *apicalis* by throat and upper breast strongly streaked with black, generally brownish grey upper parts, tan rump and pale breast, but impossible to decide whether the birds belonged to the eastern *albiventris* or western *whitlocki* race. *Apicalis* has not been recorded farther north than Quilpie, 350 km south, but MacGillivray (1929) reported a 'brown-coloured thornbill . . . uniform greyish brown on the upper surface, lighter grey under surface with a broad dark brown subterminal band on the tail and a striped throat' from Duchess just south of Mt Isa and west-north-west of Winton; I also have a record from the Macarthur Beefroad 11 km north of the Barkly Highway, NT (Gill 1971); so, the occurrence of the species at Opalton was likely.
PYRRHOLAEMUS BRUNNEUS Redthroat. B, two ♂, clearly distinguished by rufous throat on otherwise plain-grey bird. Previously recorded in Queensland only south of Wilson River, about 500 km south.

EREMIOINIS CARTERI Spinifexbird. C, four 90 km north; numerous Opalton (Officer 1970, 1971).

AMYTORNIS STRIATUS Striated Grass Wren. B and C, in quite good numbers. Distinguished by rufous upper parts strongly streaked with white, white throat, rest of underparts buff, bright rufous on flanks and black line below eye. Mr J. D. Macdonald (1970, pers. comm.) found *striatus* about 30 km south of Opalton but otherwise the nearest records for the species are apparently Alice Well, where it was collected by the 1894 Horn Expedition, and Yudanamutana near Leigh Creek, some 920 and 860 km respectively from Opalton.

STIPITURUS RUFICEPS Rufous-crowned Emu-Wren. A and B, Opalton; 30 km south of Winton. C, plentiful; one pair feeding young. Mr E. M. Tucker (pers. comm.) found the species on 19 June 1969 in mallee-spinifex country at Opalton. We watched these birds for long periods and noted males with bright rufous crowns, jacaranda-blue faces, throats and upper breasts, cinnamon-brown upper parts streaked with black and buff underparts; other birds lacked the blue. Officer (1970) has already published the first 1970 record.

MALURUS MELANOTUS Black-backed Wren. A, party of birds in female plumage. C, pair 20 km south of Winton.

MALURUS LEUCOPTERUS Blue-and-white Wren. C, pair 90 km north.

MALURUS LAMBERTI A, B and C, W-O. The race here would be *assimilis*.

RHIPIDURA LEUCOPHRYS Willie Wagtail. A, B and C, several Opalton and W-O.

MICROECA LEUCOPHAEA Jacky Winter. A, B and C, several; nest noted 1971.

PETROICA GOODENOVII Red-capped Robin. A, B and C, several W-O, most near Winton.

PETROICA CUCULLATA Hooded Robin. A, B and C, not uncommon Opalton and W-O.

PACHYCEPHALA RUFIVENTRIS Rufous Whistler. Plentiful Opalton and W-O.

COLLURICINCLA HARMONICA Grey Shrike-Thrush. B, seen and heard. C, at Opalton and W-O.

OREOICA GUTTURALIS Crested Bellbird. A, B and C, regular all areas from 10 km south of Winton.

NEOSITTA CHRYSOPTERA The local race is presumably *leucoptera*. B and C, Opalton and 95 km north.

DICAENUM HIRUNDINACEUM Mistletoebird. C, at Opalton.

PARDALOTUS RUBRICATUS Red-browed Pardalote. A, B and C, regular.

LICHMERA INDISTINCTA Brown Honeyeater. C, few 95 km north.

CERTHIONYX NIGER Black Honeyeater. C, pair.

MELIPHAGA VIRESCENS Singing Honeyeater. A, B and C, regular.

MELIPHAGA KEARTLANDI Grey-headed Honeyeater. A, B and C, commonest honeyeater, regular 30 km south of Winton.

MELIPHAGA PENICILLATA White-plumed Honeyeater. A, B and C, only along creek containing water at Opalton.

MELITHREPTUS LAETIOR Golden-backed Honeyeater. A, one seen, others heard.

PLECTORHYNCHA LANCEOLATA Striped Honeyeater. B, one.

MYZANTHA FLAVIGULA Yellow-throated Miner. B and C, common from 30 km north to Winton.

ACANTHYGENYS RUFOGULARIS Spiny-cheeked Honeyeater. C, at least 10.

POEPHILA GUTTATA Zebra Finch. A, B and C, nesting.

GRALLINA CYANOLEUCA Magpie-Lark. B and C, 4-6 birds 20 and 80 km north.

STRUTHIDEA CINEREA Apostlebird. B and C, parties 10 km east, north to Winton.

ARTAMUS LEUCORHYNCHUS White-breasted Woodswallow. C, pair 80 km north.

ARTAMUS PERSONATUS Masked Woodswallow. B and C, Opalton and W-O.

ARTAMUS SUPERCILIOSUS White-browed Woodswallow. B, Opalton. C, few W-O.

ARTAMUS CINEREUS Grey Woodswallow. A, B and C, W-O.

ARTAMUS MINOR Little Woodswallow. B and C, Opalton.

GYMNORHINA TIBICEN Black-backed Magpie. B and C, about six W-O.

CHLAMYDERA MACULATA Spotted Bowerbird. 95 km north; bower noted at Opalton.

CORVUS ORRU Crow. A, B and C, few W-O.

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THE IDENTITY OF *MICROECA BRUNNEICAUDA* CAMPBELL, 1902

The Brown-tailed Flycatcher *Microeca brunneicauda*, as currently construed, is an enigma (Keast 1958: 95; Storr 1967: 70). Though the coastal districts of the Northern Territory have been fairly well worked by collectors and though Officer (1969) regarded this bird as not uncommon in the Darwin area and occurring eastwards to Burketown, Queensland, the holotype remains the only specimen taken outside the Kimberley Division of Western Australia. What is more, Western Australian specimens differ from the original description of *brunneicauda* in that their bills are similar in size to those of *M. leucophaea*, not 'much stouter', and their tails are not 'entirely brownish' but have whitish spots on some of the outer rectrices, as noted by Mathews (1916).

Campbell (1902) based the name *Microeca brunneicauda* on a single damaged unsexed skin collected in the Northern Territory for W. H. D. Le Souëf. He diagnosed his new species as 'differing from the other familiar brown and white species [*Microeca leucophaea*] by its entirely brownish tail and by its much stouter bill'. His description runs: 'Whole of the upper surface olive-brown; under surface (including under tail coverts) white, slightly buffy about the throat and breast. There are some light-coloured facial markings but the skin (which is also unsexed) is too much damaged to define them. Bill, feet and eyes dark. Dimensions in inches:—Total length 4.5 inches; bill, .41; wing, 2.8; tail, 2.2; tarsus, .7'. Campbell named this bird Brown-tailed Flycatcher.

Le Souëf (1902: 89) described the nest and egg of the new species in a paper on eggs from the Port Darwin district.* The relation of the nest and egg to the skin described by Campbell is nowhere stated: 'The nest and egg of this new Flycatcher were found on 19th December, situated on the fork of a horizontal branch. The nest is composed of fine shreds of bark of the melaleuca tree, intermixed with grass, and is lined with fine grass, and covered externally with cobweb. Its interior measurements are— $\frac{3}{4}$ -inch in depth; breadth, $1\frac{1}{4}$ inches; exterior—depth, $1\frac{1}{4}$ inches; breadth, $2\frac{1}{4}$ inches. It is very similar to those of the other *Microecae*. The egg has a very pale creamy-white ground colour, well marked with small cloudy spots of light purplish-buff, and measures .63 x .49 inch'.

Campbell (1910), reporting on a collection of skins made by G. F. Hill in northern Western Australia, wrote: 'The collection contained a series of two species of *Microeca* which greatly puzzled me. One

* This locality in Le Souëf's writings must be interpreted very loosely. For instance, he listed eggs of *Struthidea cinerea* from the Port Darwin district, whereas to my knowledge the closest approach this species makes to Darwin is about 370 km, in the Mataranka district (Parker in prep.).

I have referred to *M. assimilis* (Gld.) [= *M. leucophaea*], while the other, which has a uniform-coloured (dark brown) tail and back slightly tinged with olive, is referable, I have no doubt now, to the new *Microeca* I described from North Australia from a mutilated skin then in the possession of Mr. D. Le Souëf, and which was named *brunneicauda*. This may be further distinguished by the yellowish-buff under wing coverts, which are brownish-buff in the other kinds.

'Amended description:—Male.—All the upper surface brown, with an olive wash on the back, wing coverts and tail coverts; wings and tail dark brown, some of the feathers of both being edged with a lighter colour (ashy); all under surface white, washed with light grey on the chest and flanks; under wing coverts yellowish-buff. Iris umber, bill dark horn, tarsus black (Hill). Length, $5\frac{1}{4}$; wing, $2\frac{1}{8}$; tail, $2\frac{1}{8}$; bill, $\frac{7}{16}$; tarsus, $\frac{1}{2}$ inches. Female.—similar to above, but slightly smaller. Habitat—Napier Broome Bay, North-West Australia'.

Of the specimens identified by Campbell (1910) as *M. brunneicauda* (of which two are in the American Museum of Natural History (AMNH) and three are in the National Museum of Victoria (NMV)), Hill (1911: 273) wrote: 'These shy and very uncommon birds were seen only on Augustus Island [$15^{\circ} 26'S$, $124^{\circ} 34'E$] and on the eastern side of Napier Broome Bay. A greenish-brown back and brown tail distinguish this species, even at a distance, from *M. assimilis*, while their habit of concealing themselves in the thickest growths of mangrove, and living entirely on small crabs and other forms of marine life, is in contrast to the conditions of life of the latter species. The loud notes of this species closely resemble those of the Yellow-faced Honeyeater (*Ptilotis chrysops*) of south-eastern Australia. One nest only was found, which contained a single egg. This nest was placed in a dead mangrove tree, 5 feet over high water mark, and was built of bark and spider web, covered on the outside with small pieces of leaf. Dimensions of nest in inches:—Outside—length, 1.6; breadth, 1.6; depth, 1.1. Inside—length, 1.4; breadth, 1.3; depth, 0.6'.

White (1915) under *M. brunneicauda*, re-described this nest and described the egg 'One egg only, oval in shape; surface of shell fine, smooth, and slightly glossy; and under the lens minute pittings can be noticed, and these are well distributed. Ground colour pale bluish-grey, spotted all over, but particularly at the larger end, where an irregular zone is formed, with chestnut and purple, those of the latter colour mostly appearing as if beneath the surface of the shell. Measurement in inches:—.77 x .54. Locality.—Taken for me by Mr. G. F. Hill at Napier Broome

Bay . . . 23 Oct 1909'. White was under the impression that this was the first description of an egg of *brunneicauda*. Had he known of Le Souëf's earlier description under this name, he might have drawn attention to the fact that Le Souëf's egg, with its 'very pale creamy-white ground colour', was a most unlikely egg for a *Microeca* to have laid.

Mathews (1916), on the basis of ten specimens (now in the AMNH) collected in the King Sound district in April 1911 by J. P. Rogers, described *Microeca brunneicauda tormenti*: 'Differs from *M. b. brunneicauda* Campbell in lacking the buff on the throat and in having the inner web of the three outer tail-feathers with a large whitish spot. Type, Point Torment, North-west Australia'. Mathews seems to have been referring to Campbell's original description rather than to actual specimens of '*M. b. brunneicauda*'. Rogers (*in* Mathews 1919-20: 72) wrote: 'This species is not common and frequents the mangroves. Is often seen on the outskirts of the mangroves and at other times in the very densest thickets'. On the labels of some of his specimens Rogers noted the stomach contents as 'large black ants which are numerous in the mangroves'.

The key to the enigma is to be found in Mathews (1908: 61). Here there is a footnote to the entry for *Microeca brunneicauda*: 'Described from a mutilated specimen. Other specimens since received prove it to be a species already known.—A.J.C.' Whereas the type-description and diagnosis of *Microeca brunneicauda* do not fit the specimens from the Kimberley Division currently placed under this name, they do fit the Brown Whistler *Pachycephala simplex*, so well in fact that no other species could have been intended by Campbell in his footnote. When the white-bellied population of the Kimberley Division was discovered by Hill, Campbell used its general resemblance to his description of *brunneicauda*—which he had to amend nevertheless—to reinstate his new species, not once referring to his comment in Mathews (1908). I conclude that by this time the holotype of *brunneicauda* had been lost or thrown away; otherwise Campbell would not have been free to propose such an equation. Receiving further material from the Kimberley Division, Mathews (1916) perceived that it did not correspond to Campbell's original description of *brunneicauda*, and described it as a new subspecies *M. b. tormenti*.

Mayr and Serventy (1944) treated *brunneicauda* as conspecific with the Lemon-breasted Flycatcher *Microeca flavigaster* without comment under 'Subspecies or synonyms . . . 378(379)'. Vaurie (1953: 530) stated: ' . . . one could treat *brunneicauda* and *flavigaster* which are especially close, as conspecific . . . However, according to Mathews' check list (1930) their ranges overlap in Northern Territory'. With the single specimen of *brunneicauda* from the

Northern Territory now referred to *Pachycephala simplex*, the step indicated by Mayr and Serventy, and Vaurie becomes practicable. The main difference between *flavigaster* and the taxon currently known as *brunneicauda* is that the former has the underparts mainly yellow and the latter has them mainly white. This difference is lessened by the fact that immatures of *flavigaster* are white below (Mathews 1919-20: 75; M. LeCroy *in litt.*). Both forms inhabit mangroves; *flavigaster* has been recorded also in riverine thickets, on the edges of rainforest and in open forest. The population of the Kimberley Division (the correct name for which is *tormenti* Mathews) is, on present information, separated from *flavigaster* by a gap of 280 km between Napier Broome Bay and Carlton Reach, Ord River*. Investigations are needed in this area to determine whether *tormenti* and *flavigaster* meet, and if they do, how they react. For the present I adopt the suggestion of Mayr and Serventy, and Vaurie that they are conspecific, an arrangement supported by M. LeCroy (*in litt.*).

London (1966: 200) and Rix (1970: 171) reported sightings of the Brown-tailed Flycatcher in the Darwin area. Officer (*op. cit.*) reported it as not uncommon in the Darwin area, and as extending eastwards through the Northern Territory to Burketown. In view of the foregoing I suspect that these sighting were of Brown Whistlers (Officer commented on the stout bill) or individuals of the Lemon-breasted Flycatcher with whitish underparts.

In summary: the new synonymy stemming from the above conclusions is:

Microeca brunneicauda: Campbell, 1902 = *Pachycephala simplex* Gould, 1843.

Microeca brunneicauda: Campbell, 1910 and *Microeca brunneicauda tormenti* Mathews, 1916 = *Microeca flavigaster tormenti* Mathews, 1916.

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PREDATION BY SOUTHERN SKUA ON RABBITS ON MACQUARIE ISLAND

The Southern Skua *Catharacta skua lonnbergi*, which breeds principally on subantarctic islands, is considered to be analogous to the birds of prey among the seabirds of those latitudes. Observations that I made between 1965 and 1969 on Macquarie Island while investigating the rabbit population there support this.

In common with most birds on the Island the Skua breeds during summer. Their eggs hatch as late as early January but the latest that I have recorded is 22 December. The last chicks fledge in March when migration from the Island begins.

Being an opportunistic feeder, the Skua has a wide range of food available during breeding. Carrion, eggs and young of seabirds, adult burrowing petrels, small mammals as well as garbage provide its diet. It also swiftly preys on debilitated and wounded animals such as penguins and seals, especially the Southern Elephant Seal *Mirounga leonina*. Skuas are frequently seen to take milk from lactating Elephant Seals alongside the pups and after the pups have fed (M. W. Bryden 1965, pers. comm.).

The population of rabbits, which reaches plague proportions, is exposed to predation by Skuas at the most critical time of the breeding cycle. The first litters are being dropped in November when the Elephant Seals have already pupped, and the last litters of a well-defined and rather short breeding season are regularly dropped in the first weeks of March, coincident with the fledging of the youngest Skua chicks. Juvenile rabbits are therefore potential prey in the nesting territory of the birds while they are rearing chicks.

I have noted three different ways in which Skuas prey on rabbits. Most often they scavenge ill or

injured animals. Any lethargic, ill or wounded rabbit, including full-grown adults, is likely to be attacked. Before attacking, the bird often stoops at the rabbit and, if this is not countered by a rapid and vigorous evasive move, the attack will be pressed home by attacking on the ground. The *coup de grace* is normally given by repeated blows of the beak on the base of the skull. Sometimes before this the Skua may remove the eyes. On several occasions when trapping rabbits alive with toothless padded gins I have found it necessary to stay near the traps to ensure that Skuas did not kill trapped animals before they could be reached.

Juvenile rabbits from burrows in nesting territories of Skuas are apparently preyed upon heavily when they first leave the burrows to feed independently. I have commonly noted Skuas investigating burrows and less commonly, probably after verifying that juveniles are inside, alertly standing above the entrance. I have twice seen Skuas successfully catch young rabbits as soon as they showed themselves.

Less often I have seen Skuas dive on healthy animals on open ground. I have noted such attacks several times on full-grown animals up to 2,800 g total weight, but always unsuccessfully. The largest healthy rabbit that I have seen to be caught in this way weighed 1,300 g and would have been about three months old. This was in March and the rabbit was probably from a first litter of that breeding season. The Skua in such attacks stoops like many raptors but, lacking talons, it uses its momentum and weight to knock the rabbit off its feet for long enough to allow it to kill it with its beak. The Skua made several stoops and ensuing ground-flurries before killing the 1,300-g rabbit. If the rabbit had

been nearer its burrow, it would have been able to escape after the failure of the first attempt. I have seen less prolonged successful attacks on smaller rabbits.

From observations during four successive breeding seasons I think that frequency of attacks on rabbits by the last two methods increases as the breeding season progresses. This impression is supported by the fact that young Skuas naturally increase in size as they near fledging and demand more food from their parents, at a time when eggs and chicks of

penguins are less available. Though burrowing petrels and their fledgelings remain available at this time, the most abundant prey appears to be rabbits, which would thus be more heavily preyed on.

My preliminary studies on ageing in the rabbit population indicate a heavy selective mortality in young of the year. Thus, probably the Southern Skua exerts an important pressure on the population by preying on the young although other mortality factors such as drowning in burrows are also involved.

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