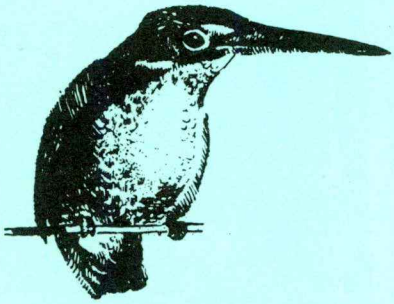
AUSTRALIAN BIRDS



Journal of the
N.S.W. FIELD ORNITHOLOGISTS CLUB

Vol.17, No. 4 June, 1983

ISSN 0311–8150

Registered by Australia Post — Publication No. NBH0790

THE N.S.W. FIELD ORNITHOLOGISTS CLUB

OFFICE BEARERS

PATRON	A.R. McGill
PRESIDENT	A.E.F. Rogers
SECRETARY	C. MacDonald
TREASURER	K. Lisser
RECORDS OFFICER	T.R. Lindsey
FIELD DAY ORGANISER	A. Lindsey
CONSERVATION OFFICER	R.A. Buchanan
EDITOR OF AUSTRALIAN BIRDS	T.R. Lindsey
EDITOR OF NEWSLETTER	A. McBride
COMMITTEE	E. Hoskin

The object of the Club is to promote the study and conservation of Australian birds and the habitats they occupy.

Annual subscription rates of the Club (due 1st July each year) are:

Adult Member	$10.00
Junior Member (up to 17 yrs)	$ 5.00

All members receive a quarterly newsletter and a copy of the quarterly journal "Australian Birds". The price of the journal is $2.00 plus postage per issue to non-members. Club badges are available to club members at $1.40 or $1.70 if posted. The Club holds a meeting and a field excursion each month.

All correspondence should be addressed to the Hon. Secretary and all membership fees should be sent to the Hon. Treasurer at:

P.O. Box C436, Clarence Street, Sydney. N.S.W. 2000.

Manuscripts should be sent to the Editor at:

Dept. of Ornithology, Australian Museum,
6-8 College Street, Sydney 2000.

AUSTRALIAN BIRDS

Vol. 17, No. 4 June, 1983

THE PARASITIC HABITS OF THE CHANNEL-BILLED CUCKOO *SCYTHROPS NOVAEHOLLANDIAE* IN AUSTRALIA

M. T. GODDARD AND S. MARCHANT

SUMMARY

Little information is available about the breeding of the Channel-billed Cuckoo *Scythrops novaehollandiae*. We have gathered 78 authenticated records of the nests of nine species being parasitized; most of these are from north-eastern New South Wales and south-eastern Queensland. Pied Currawongs *Strepera graculina* and *Corvus* spp. are the chief hosts. Two female Cuckoos sometimes lay in the same nest and individuals can lay at least five eggs so that parasitized nests may contain many eggs. Laying routine by the Cuckoo is not known. Female Cuckoos tamper with the eggs of the host but details are not known. Nestling Cuckoos do not evict their siblings but what happens to the eggs or young of the host is not known; there are only two records of hosts' young being reared with young Cuckoos.

INTRODUCTION

The Channel-billed Cuckoo *Scythrops novaehollandiae* ranges from Flores and Sulawesi eastward through New Guinea to northern and eastern Australia. It is unusual among the Cuculinae for its large size (length c. 600 mm), massive bill (c. 60 mm), raucous calls and diet of fruit. We confine this review to breeding in Australia because we have no data from Indonesia and note that Rand and Gilliard (1967) derive their remarks on the breeding of this species from Australian data.

Campbell (1900) and North (1912) gave what details of breeding of the Channel-billed Cuckoo were known at the start of the century. Few records of original observations since then have been published. In spite of assertions about large numbers of Cuckoo's eggs being found in parasitized nests, about non-eviction of nest-contents by nestling Cuckoos and about the survival of the hosts' young in parasitized nests (Disney 1976; Chisholm 1933 and other publications by him) little firm evidence for these matters is on record.

In addition to the literature, we have records by MTG of 45 parasitized nests from the Tenterfield-Walcha district of New South Wales and one from Cloncurry, Queensland, from 1954 onwards, and some data from museum collections (Table 1).

GENERAL NOTES

We have both made general notes on young Channel-billed Cuckoos. During fifteen hours watching at the parasitized nest of a Pied Currawong *Strepera graculina* at Moruya, SM noted 64 feeding visits: 11 for the larger nestling Cuckoo alone; 14 for the smaller; 16 for both; and the rest not identified. Competition between the nestling Cuckoos for food was not seen but Pied Currawongs often bring enough food at one visit to feed, if not satisfy, three of their own young (SM); so competition between sibling Cuckoos in the nest may not arise. The nestling Cuckoos had gapes of the same pinkish red shade as nestling Currawongs. MTG has noted that fledgelings have a begging call like that of fledgeling Pied Currawongs.

Hatchling Channel-billed Cuckoos are naked and have bronze-coloured skins, whereas hatchling crows and Pied Currawongs have down (MTG). The nestling and juvenile plumages of the Cuckoo may be well known in museum skins but, as far as we can find, have been mentioned only by Hall (1903), North (1912), McLennan (Macgillivray 1914) and Disney (1976). None of these accounts agrees entirely with observations of fledgelings at Moruya (SM). They say that the lighter parts of the plumage (head, breast, shoulders of wings, tips of wing-coverts, etc.) are pale buff; but they were bright or deep buff, verging to golden or rufous, in the fledgelings at Moruya. The bill, though heavy and deep, was not longer than the head and was dark blackish brown, pale at the tip; a dark blackish line of bare skin ran back to the eye but no bare skin appeared round the eye. MTG has noted that the contact and food-begging calls of the fledgeling Cuckoos are quite distinctive: louder, more raucous and clamorous, but nevertheless reminiscent of those of fledgeling Pied Currawongs, Australian Magpies and corvids. The Cuckoo's calls seem to have evolved to attract the foster parents of all three hosts.

There are apparently no published records of adult Channel-billed Cuckoos feeding each other but Mr C. Patterson, while staying at Moruya with SM in early December 1978, saw one Cuckoo feeding another with a large insect.

HOSTS AND MIMICRY OF EGGS

Table 1 shows what species of birds have been recorded as hosts of the Channel-billed Cuckoo. There are also indefinite reports of it parasitizing corvids, Pied Currawongs and even the Brown Falcon *Falco berigora* (North 1912), which we have omitted. Almost all records come from north-eastern New South Wales and south-eastern Queensland, where the Pied Currawong and *Corvus* spp, especially the Torresian Crow *C. orru,* are the usual hosts. Only corvids and Pied Currawongs have in fact been satisfactorily recorded as rearing young Cuckoos or feeding them out of the nest (own data; refs in Table 1), except for Australian Magpies *Gymnorhina tibicen* three times seen feeding young out of the nest (Lord 1933; North 1912).

At Tenterfield and Moruya, 5° of latitude apart in eastern New South Wales, Australian Magpies and Australian Ravens *Corvus coronoides* start to breed in July and August so that generally their nests are not available for the Cuckoos, which arrive about September; these hosts do not normally have second broods so that late or replacement nests are only rarely available for the Cuckoos and neither species is likely to be important as a host in New South Wales.

Moruya is close to the southern breeding limit of the Channel-billed Cuckoo and there, from 1976 to 1982, the species has occurred only between 1 October and 1 January, except in 1981 when birds arrived on 21 September (SM). Pied Currawongs are their only regular hosts but the timing is acute because during these years the Currawongs have started their nests always before 28 September and do not have second nests unless the first is destroyed; indeed, this timing, as much as any factor, may restrict the breeding range of the Cuckoo to north of about 36° south.

Apart from the observation of courtship feeding noted above, courtship display or behaviour by the Channel-billed Cuckoos has not been seen at Moruya. When the birds arrive, they are usually seen as closely associating pairs, especially noticeable when they are flying over open country or visiting fig-trees in Moruya itself. This suggests that courtship and pair-formation take place before the birds arrive, unless the pair-bond is maintained for life. Thus the Cuckoos are probably ready to start laying as soon as they reach the district.

The other species of host in Table 1 are probably parasitized only occasionally, perhaps by female Cuckoos that lay in unusual nests when they have not been able to find suitable nests of their normal hosts in time or by itinerant females that do not hold established territories. Outside the breeding range of Pied Currawongs in northern Australia the Torresian Crow may be the chief host.

Channel-billed Cuckoos' eggs may mimic those of Pied Currawongs so well that they can be separated only by careful examination of the shells. They are quite distinct from those of Torresian Crows and Australian Magpies (MTG; Campbell 1913, 1927), which strengthens the view that the Pied Currawong is the primary host in eastern Australia, but it is curious that mimicry of the eggs of the Torresian Crow has not been noted there, though it is a frequent host.

NUMBER OF EGGS LAID BY INDIVIDUAL CHANNEL-BILLED CUCKOOS

Table 2 records all combination clutches from nests of Pied Currawongs and corvids available to us. Large numbers (5-8) of Channel-billed Cuckoos' eggs in one nest and layings by two female Cuckoos in the same nest have been recorded only in the nests of corvids: no comment was made on the type of eggs in one nest with six Cuckoo's eggs (Anon. 1927); MTG recorded that one laying of five eggs, judged by their similarity, was attributable to a single female and that two different females with recognizably different types of eggs laid together in the same crow's nest three years running (3 + 4, 3 + 5 and 2 + 3 eggs respectively; in the fourth year another Cuckoo parasitized the same crow, laying a single egg); and McLennan's record (Macgillivray 1914) of five young Cuckoos in a nest of the Little Crow *C. bennetti*. These are the only records of large layings that we know. MTG has also noted that a female Cuckoo may parasitize the same host individual in successive seasons: for three, in a Pied Currawong's nests; for five, in a crow's nests. This suggests that Cuckoos remain faithful to one breeding locality for several years and implies that each may be conditioned to parasitize one species of host, as found in the European Cuckoo *Cuculus canorus* (Chance 1922, 1940; Wyllie 1981).

It is impossible to say whether any of the clutches of Cuckoos or hosts in Table 2 was complete. However, the state of incubation was recorded for 20 layings in crows' nests and for 24 in Pied Currawongs'. Excluding those sets recorded as fresh or nearly so and therefore perhaps incomplete, we have 26 probably complete layings: 11 in crows' nests (3 with 1, 2 with 2, 4 with 3, 1 with 4 and 1 with 5 Cuckoos' eggs, these figures being adjusted so that the three layings attributed to two female Cuckoos in one nest are separated) and 15 in Pied Currawongs' (8 with 1, 4 with 2 and 3 with 3 Cuckoos' eggs). The respective average layings of Cuckoos are 2.5 and 1.7; the average number of crows' eggs is 2.7 and of Pied Currawongs' 1.5 but these may have little significance because crows generally lay from four to six eggs and Pied Currawongs three to five. Sometimes, if a parasitized nest of a Torresian Crow or Pied Currawong is taken, the same female Cuckoo will parasitize the replacement nest of the host; when this has been noticed (twice for each host; MTG), the Cuckoo has laid more than one egg in the replacement.

TABLE 1

Recorded hosts of the Channel-billed Cuckoo

Hosts	Own data	Museums*	Literature**	Total
Accipitridae				
Collared Sparrowhawk *Accipiter cirrhocephalus*	–	1	1	2
Corcoracidae				
White-winged Chough *Corcorax melanorhamphos*	1	–	–	1
Grallinidae				
Australian Magpie-lark *Grallina cyanoleuca*	1	–	–	1
Cracticidae				
Australian Magpie *Gymnorhina tibicen*	1	2	4	7
Pied Currawong *Strepera graculina*	23	5	3	31
Corvidae				
Australian Raven *Corvus coronoides*	6	–	3	9
Forest Raven *Corvus tasmanicus*	1	–	–	1
Little Crow *Corvus bennetti*	1	1	1	3
Torresian Crow *Corvus orru*	13	3	–	16
Corvus spp	–	–	7	7
Totals	47	12	19	78

* Australian Museum (AM), National Museum of Victoria (NMV), South Australian Museum (SAM).

** Anon. 1927; Campbell 1900; Le Souef 1907; Lindsey 1981; Lord 1939; Macgillivray 1914; North 1912; RAOU Nest Record Scheme.

Between 12 and 25 have been given as totals of eggs laid by one parasitic Cuckoo in a season, derived by different methods of investigation (Chance 1922, 1940; Baker 1942; Payne 1977; Wyllie 1981). That the Channel-billed Cuckoo lays nearly so many eggs or that it lays normally in more than one 'clutch' or series in a season is unlikely, at least in eastern New South Wales; its hosts breed well dispersed and, being single brooded, probably present quite a short period of opportunity for parasitization; if a female Cuckoo confined herself to lay three to five eggs in one nest during a period of five to ten days, she would probably have little chance of repeating the performance. Thus, possibly five eggs may represent the maximum number of eggs laid in a season. North (1912) mentioned two specimens that each had just four developing eggs in the oviduct when collected.

LAYING

There is little direct evidence about the laying intervals of the Channel-billed Cuckoo. MTG once recorded four to five days between the laying of each of three eggs in a Pied Currawong's nest but has also estimated from the state of incubation of eggs that the interval has been about 48 hours. McLennan (Macgillivray 1914) noted for five young in one nest that 'they were all in a series – there seemed to be about two days between each of them'. Of two nestlings in the Pied Currawong's nest at Moruya (SM), clearly visible for only six days before fledgeling, the smaller at first seemed about one half to two-thirds the size of the larger, judged by the lengths of heads and bills, yet on the day before they fledged there seemed to be little difference in size. This scanty evidence at least suggests asynchronous hatching, though at what interval is speculative.

It is not known at what time of day the Cuckoo lays. On 2 November 1981 and again on 4 November, on both days between 10:00 and 12:00 hours, MTG was alerted by a commotion among Channel-billed Cuckoos and Pied Currawongs at the same place. On 7 November he found a nest of the Currawongs, which held two eggs of each species. One Cuckoo's egg was quite fresh and the other slightly incubated. The fresh egg may have been laid that morning. Both Currawong's eggs were quite fresh, one being slightly damaged.

REMOVAL OR DESTRUCTION OF HOSTS' EGGS

It is unusual to find an undamaged complement of hosts' eggs in a parasitized nest, one, two or more eggs generally being cracked or dented. In one crow's nest, with three eggs of the host and two of the Cuckoo, another crow's egg was among the sticks at the edge of the nest and there were the remains of another on the ground below. Fragments of shells of hosts' eggs are often found on the ground directly below parasitized nests (MTG).

Mr A.C. Cameron tells us that at Chinchilla, Queensland, a Channel-billed Cuckoo left a Pied Currawong's nest, with an egg in its beak; it dropped the egg, which could not be found. The H.L. White Data Book (NMV) attributed a broken Currawong's egg in a fresh clutch with one Cuckoo's egg to 'the work of the *Scythrops*'. MTG once recorded the Cuckoo robbing the contents of a nest of the Apostlebird *Struthidea cinerea*. North (1912) gave an ambiguous report of the Cuckoo throwing 'young *Grallina* out of their nest'.

These last two records may indicate that the Channel-billed Cuckoo preys on the contents of nests or that it may destroy them to provide itself with an opportunity to parasitize a replacement nest, as suggested for other cuckoos (Fien 1970; Marchant 1972; Wyllie 1981). The damage to hosts' eggs that remain in the nest could be the result of accident, clumsiness or haste by the female Cuckoo; it could also be deliberate and, if the eggs were not too broken, the host would probably continue to incubate uselessly.

Combination clutches (Table 2) throw no light on the matter because the number of host's eggs that may have been laid was never known. Layings in which no eggs of the host were found could suggest that they had been removed but cuckoos sometimes lay in nests before the host starts to do so (Wyllie 1981; SM pers. obs.). Laying with large numbers of host's eggs (4-5 for crows; 3-4 for Pied Currawongs), when the host's eggs might represent a full clutch, could suggest that no host's eggs had been removed.

Evidence for removal or destruction of hosts' eggs is meagre and conflicting but it seems certain that the female Channel-billed Cuckoo tampers with them; the extent of damage could vary with individual females or an individual could vary its methods. In any case, it is hard to imagine how six to eight Cuckoo's eggs and up to four host's eggs can accumulate in a nest, if the Cuckoo removes eggs as a normal routine. There is some evidence that mimicry of eggs by parasitic cuckoos dupes their hosts (Baker 1942), though this has been doubted (Payne 1977). There is no obvious solution of how the Cuckoo distinguishes its own eggs from those of a Pied Currawong for example, where mimicry is good. Clearly, when laying its first egg, it could safely remove or damage hosts' eggs before laying but thereafter distinction between eggs of the two species would be increasingly difficult. The problem is worse confounded when two females parastize the same nest.

TABLE 2

Number of combination clutches of eggs of the Channel-billed Cuckoo with those of corvids and Pied Currawongs.

	Number of eggs of												
Cuckoo	Corvid							Pied Currawong					
	0	1	2	3	4	5	Total	0	1	2	3	4	Total
1		2		1	1	3	7		1	8	6		15
2	1	1		1	3	2	8	2	1	3	1	1	8
3	1	1		1	1		4	2	1				3
4							0						
5			1	1			2						
6					1		1						
7		1					1						
8			1				1						
Total	2	5	2	4	6	5	24	4	3	11	7	1	26

EVICTION OF EGGS OR YOUNG BY YOUNG CUCKOOS

McLennan's record (Macgillivray 1914) of five nestling Channel-billed Cuckoos in a nest, the two nestling Cuckoos at Moruya (SM) and records of two or three fledgeling Cuckoos being fed by their hosts (e.g. Campbell 1900; North 1912) show that nestling Cuckoos do not evict their siblings. That this is so with eggs and young of the host, at least in the first week or so after hatching, is shown by MTG's records: one young Cuckoo (< 7 days old) with four young crows (from < 7 days old to just hatched); one young Cuckoo (< 7 days old) with three young Australian Ravens (< 7 days old) and one damaged Raven's egg. There are two records of survival to fledging of hosts' young: a young crow reared with two Cuckoos (Le Souef 1907) and one young crow reared with a young Cuckoo (MTG). As far as we can find, there is no record of young Pied Currawongs being reared with young Cuckoos.

Usually the young of the host disappear without trace from the nest within a week of hatching (MTG). Eggs of other parasitic cuckoos generally have somewhat shorter incubation periods than those of their hosts but the nestling period is usually longer (Baker 1942; Payne 1977; Wyllie 1981). The incubation period for eggs for the Channel-billed Cuckoo is not known, though MTG has noted that the eggs develop more quickly than those of their hosts. To lay four or five eggs in one nest, the Cuckoo would take eight to ten days, the last eggs possibly being laid after the host has begun to incubate, resulting perhaps in some disadvantage to the young Cuckoos. On the other hand, the nestling period of the Cuckoo is probably 17 to 24 days (the young Cuckoos at Moruya hatched between 24 and 30 October and fledged on 17-18 November), whereas that of Pied Currawongs is 30-37 days (Recher 1976; SM). When at least 12 days old on 12 November, the larger nestling at Moruya appeared as large as a fledgeling Pied Currawong and, when it left the nest, about the size of an adult.

Probably the young Cuckoos simply outgrow the young of the hosts, which, unable to get enough food, decline and die, as apparently happens with the young of some species parasitized by cowbirds *Molothrus* spp. (Friedmann 1963; SM). The parents probably remove their remains, as do many birds if their young die in the nest. However, Campbell (1900) and North (1912) recorded that fledgeling Cuckoos have been seen to be fed carrion by their foster parents.

CONCLUSION

This review raises more questions than it answers but our aim has been to assemble the facts that have been recorded about the breeding habits of the Channel-billed Cuckoo. A strange aspect of what is so far known is the apparent contrast between its performance when parasitizing crows and Pied Currawongs. According to the host, it seems that mimicry of eggs, number of eggs laid in a nest, laying by two female Cuckoos in a nest and possibly survival of host's young differ to such an extent that one wonders whether the Cuckoo uses a different strategy for parasitizing different hosts. In any case we need full details of all aspects of the Cuckoo's breeding habits, especially from outside the range of the Pied Currawong.

ACKNOWLEDGEMENTS

We are grateful to Messrs W.E. Boles and N.W. Longmore (AM), A.R. McEvey and Miss B. Gillies (NMV), Messrs S.A. Parker (SAM), A.R. McGill, A.C. Cameron and K. Lowe for help and information. Drs J.F. Monk and S.J.J.F. Davies and Mr T.R. Lindsey improved drafts of the paper immensely.

REFERENCES

Anon. 1927. Eggs of the Channel-billed Cuckoo (*Scythrops novaehollandiae*). Aust. Zool. 4: 330.

Baker, E.C.S. 1942. Cuckoo Problems. Murray, London.

Campbell, A.J. 1900. Nests and Eggs of Australian Birds. Privately, Sheffield.
—— 1913. A Commonwealth collection. Emu 13: 65-74.
—— 1927. The Belltrees Zoological collection. Emu 26: 300-301.

Chance, E.P. 1922. The Cuckoo's Secret. Sedgwick & Jackson, London.
—— 1940. The Truth about the Cuckoo. Country Life, London.

Chisholm, A.H. 1933. The Cuckoo problem in Australia. Auk 50: 385-395.

Disney, H.J. de S. 1976. *In* Complete Book of Austrlaian Birds. Reader's Dig. Serv., Sydney.

Fien, I. 1970. Behaviour of Horsfield Bronze Cuckoo at nest of Red-backed Wren. Emu 70: 201.

Friedmann, H. 1963. Host relations of the parasitic cowbirds. Bull. US natn. Mus. 233.

Hall, R. 1903. Notes on a collection of birdskins from the Fitzroy River, north-western Australia, III. Emu 7: 40-43.

Le Souef, D. 1907. Two cuckoos reared in one nest. Emu 7: 37, 87.

Lindsey, T.R. 1981. NSW bird report for 1980. Aust. Birds 16: 1-23.

Lord, E.A.R. 1933. Movements of migratory birds in the Murphy's Creek district, Queensland. Emu 32: 207-210.
—— 1939. Notes on migratory birds, 1937-38. Emu 38: 372-376.

Macgillivray, W. 1914. Notes on some Queensland birds. Emu 13: 132-186.

Marchant, S. 1972. Destruction of nest-contents by cuckoos. Emu 72: 29-31.

North, A.J. 1912. Nests and Eggs of Birds found breeding in Australia and Tasmania, III. Spec. Cat. 1 Aust. Mus. Sydney.

Payne, R.B. 1977. The ecology of brood parasitism in birds. Ann. Rev. Ecol. Syst. 8: 1-28.

Rand, A.L., and E.T. Gilliard. 1967. Handbook of New Guinea Birds. Weidenfeld & Nicolson, London.

Recher, H.F. 1976. Reproductive behaviour of a pair of Pied Currawongs. Emu 76: 224-225.

Wyllie, I. 1981. The Cuckoo. Batsford, London.

M.T. Goddard, 180 Manners Street, Tenterfield, NSW 2372.
S. Marchant, PO Box 123, Moruya, NSW 2537.

A PECULIARITY IN THE FEEDING BEHAVIOUR OF GLOSSY BLACK-COCKATOOS

LEO JOSEPH

On Kangaroo Island, South Australia, Glossy Black-Cockatoos *Calyptorhynchus lathami* feed on seeds extracted from cones of female Drooping Sheoaks *Casuarina stricta*. So systematic is their method of husking the cones that the cone remnants one frequently finds beneath sheoaks on Kangaroo Island are sure signs of the Cockatoos having fed in the trees. Furthermore, the Kangaroo Island Glossy Black-Cockatoos always husk the cones from their proximal end (*i.e.* where the cone is attached to its stalk). I found only two exceptions to this "rule" in examining many hundreds of cone remnants on Kangaroo Island (see Joseph 1982 for details).

On 17 July 1982, L. Edington and I found a small grove of *Casuarina stricta* five kilometres west of Minore, New South Wales, alongside the Dubbo-Narromine railway line. The habitat in the area was *Callitris* and *Eucalyptus* woodland. Cone remnants beneath the casuarinas appeared very similar to those we had both seen on Kangaroo Island (as described above) except that each cone had been husked from its distal, or free, end — the stalk remaining at the other end being clearly visible. We took a random sample of 110 cone remnants and found it to be composed entirely of cones husked from the distal end. We saw no exceptions in the course of additional searching.

A short time later, *ca* three kilometres further west, we found a family party of three *C. lathami* feeding on cones of *Casuarina stricta*. We clearly saw the birds husking the cones from the distal end. We subsequently examined cone remnants beneath the trees in which the birds had fed; we found these remnants to be identical to those we had found and sampled earlier.

Cones eaten by Kangaroo Island birds and those seen near Minore appeared to be about equal in ripeness, and it therefore seems unlikely that the cockatoos' method of attack is influenced by variations in ripeness. Apparently, *Casuarina stricta* is a minor food item of eastern Australian populations of the Glossy Black-Cockatoo, except in the case of those found in the New South Wales Riverina (Llewellyn 1974, Forshaw 1981). Nevertheless, the above observations raise the possibility that Glossy Black-Cockatoos in eastern Australia consistently husk *Casuarina stricta* cones from the distal end; this would be in sharp contrast to the way in which the Kangaroo Island birds husk the same cones. Such a difference between mainland and Kangaroo Island populations, although at first seeming rather trivial, would be remarkable if confirmed. I hope that other observers will be encouraged to examine *Casuarina stricta* cone remnants in eastern Australia to test this possibility.

REFERENCES

Forshaw, J.M. 1981. Australian Parrots. Second Edition. Melbourne: Landsdowne.

Joseph, L. 1982. The Glossy Black-Cockatoo on Kangaroo Island. Emu 82: 46-49.

Llewellyn, L.C. 1974. New records of red-tailed black cockatoos in south-eastern Australia, with a discussion on their plumages. Emu 74: 249-253.

Leo Joseph, 1 Angas Street, Kent Town, SA 5067.

AN OBSERVATION OF A PELICAN ATTACKING AND APPARENTLY EATING A YOUNG GREY TEAL

BILL CAMBRIDGE

At approximately 14:30 hrs on 12 November 1982, I interrupted my travels to observe the various water birds present at Grahamstown water reservoir near Raymond Terrace, New South Wales.

One of the first species noted was a pair of Grey Teal *Anas gibberifrons* with three downy young. They were swimming in the general direction of a small island on which there were a number of Australian Pelicans *Pelecanus conspicillatus* and Coots *Fulica atra*.

While my attention was focussed on other birds to the right of this group, my observations were interrupted by a sudden commotion which had developed around the teal.

One of the pelicans was attacking the Grey Teal causing the adult teal to use diversionary tactics in an attempt to draw attention away from the three young. Tactics used by the adult teal consisted of injury-feigning and direct attack on the pelican, while the three downy young attempted escape by diving and swimming under water.

The pelican then lunged with its bill in the direction of one of the diving young teal and, upon lifting its head and bill clear of the water, was seen to have a struggling object in its bill which it proceeded to swallow. A count of the Grey Teal revealed only two downy young remaining with the parents. Observations were continued for several more minutes but the third young bird did not reappear.

I could not be certain that the object swallowed by the pelican was in fact the young teal, but the facts that (a) the pelican attacked the young teal, (b) the pelican was seen to swallow something struggling, and (c) I could not find the young teal thereafter, led me to conclude that I had seen an example of predation by a pelican on Grey Teal. Lowe & Lowe (1976, Australian Bird Watcher 6: 169-170) have reported Australian Pelicans attacking Silver Gulls *Larus novaehollandiae*, but I am not aware of any other records of pelicans feeding on other birds.

Bill Cambridge, c/o Gaytime Caravan Park, Pacific Highway, Belmont NSW 2280.

JUVENAL PLUMAGE OF THE YELLOW-LEGGED FLYCATCHER

WALTER E. BOLES

The Yellow-legged Flycatcher *Microeca griseoceps* is one of the least known members of its genus. Although it has generally been accepted as belonging to the genus *Microeca,* there have been occasional suggestions that this species may be more closely allied to *Tregellasia* (i.e., Pale-yellow Robin *T. capito* and White-faced Robin *T. leucops*). Storr (1973) thought that such a possibility should not be discounted until information on its nidification and juvenal plumage were obtained. Subsequently, descriptions of the nest and eggs were reported by Noske & Sticklen (1979). These agreed well with those of other species of *Microeca.*

While examining specimens in the American Museum of Natural History, I was able to determine the juvenal pattern of *M. griseoceps.* It had been mentioned by Vaurie (1953) in the generic account of *Microeca* in his revision of the typical flycatchers (Muscicapini), but as this appears to have been overlooked since then, it seems worthwhile to draw attention to it.

Specimen AMNH 604687 retains only a few juvenal feathers on its head and back. These are mid-brown with very pale buff terminal centres to the tips. This is the typical pattern of the dorsal surface and upper wing coverts in juvenals of *Microeca.* On the breast and upper belly the pattern is reversed with a dark terminal tip on a paler feather. This pattern in Australo-Papuan flycatchers is found only in *Microeca* and the related Torrent Flycatcher *Monachella muelleriana* of New Guinea (*Tregellasia* is rufous, unmarked except for occasional pale streaks on the crown). It therefore is reasonable to assume that *M. griseoceps* exhibits this general pattern in full juvenal dress.

Like Vaurie, I was able to confirm this juvenal plumage in six species: *M. griseoceps,* Canary Flycatcher *M. papuana,* Olive Flycatcher *M. flavovirescens,* Lemon-breasted Flycatcher *M. flaviventer,* Jacky Winter *M. leucophaea* and Kimberley Flycatcher *M. tormenti* (the latter is listed as *M. brunneicauda* by Vaurie — see Parker, 1973). The only species for which this plumage has not been reported is the Tenimbar Flycatcher *M. hemixantha* of Tenimbar Island, but as this species is undoubtedly derived from a mainland New Guinea form (probably *M. papuana*), it most likely also shares this pattern.

These observations were made while working at the American Museum of Natural History, New York, with the support of a Frank M. Chapman Memorial Grant.

REFERENCES

Noske, R.A. & R. Sticklen. 1979. Nest and eggs of the Yellow-legged Flycatcher. Emu 79: 148-149.

Parker, S.A. 1973. The identity of *Microeca brunneicauda* Campbell, 1902. Emu 73: 23-25.

Storr, G.M. 1973. List of Queensland birds. Spec. Publs. West. Aust. Mus. (5).

Vaurie, C. 1953. A generic revision of the flycatchers of the tribe Muscicapini. Bull. Am. Mus. Nat. Hist. 100: 459-538.

Walter E. Boles, Department of Ornithology, Australian Museum, 6-8 College Street, Sydney NSW 2000.

APPEASEMENT DISPLAY OF THE RED WATTLEBIRD

D.C. McFARLAND

The principle aim of appeasement displays within groups of animals is to reduce aggression between members thereby allowing subordinates to approach and use some necessary resource, e.g. food, which is controlled by a dominant individual (Brown 1975). Reduced aggression within the group also tends to promote greater group cohesion which may, in turn, enhance other advantages possible in groups, such as co-operative breeding and more effective predator and territory surveillance.

Among honeyeaters agonistic encounters are common (Officer 1964) but appeasement displays are rare and not highly developed (Immelmann 1961). In those cases where a submissive behaviour has been described, the display is reminiscent of the begging activity of young birds (Immelmann loc. cit.).

While investigating the foraging behaviour of a group of Red Wattlebirds *Anthochaera carunculata* I noticed that a small member could gain or retain access to an artificial nectar supply by use of a particular display directed at a larger bird. Over the study period (April to June 1980) the group consisted of four birds which inhabited a 1.6 ha woodlot in Beverley Hills, NSW. The feeding station consisted of four jars containing artificial nectar (a mixture of honey and water), arranged on a horizontal limb of a Blue Gum *Eucalyptus saligna,* four metres above the ground. The station was observed for two hours (08:00-10:00 hrs) on each of five consecutive days (1-5 June 1980). Body sizes were easily comparable when the birds perched at the feeding station.

I saw the presumed appeasement display twelve times. The display was given either when a larger bird, while feeding, was approached by a smaller wattlebird (n=10), or vice versa (n=2). The display was essentially the same on all twelve occasions, and the following is a description of a typical encounter. Initially, the smaller individual oriented itself side on to the other bird and simultaneously lowered its head and raised its tail so that it squatted low and horizontal to the branch. The body plumage appeared sleeked down and the tail was held in the normal relaxed position. The bill was held horizontally except for the few occasions when the bird turned its head to glance at the larger bird.

Once in this pose the smaller bird began to flutter its wings while the larger bird sat upright (Fig. 1). In wing fluttering, the wrist joint was held away from the body and the tip of the wing moved up and down by twisting the wing joint and rotating the forearm. The bird then "sidled" along the branch towards the larger bird (in the two cases when the larger was approaching the smaller bird, the onset of wing-fluttering caused the former to stop). The larger watched the display for a while and then flew out of the tree. On one occasion the larger attempted to compulate but failed and flew away. When the larger bird left, the smaller began or continued to feed at the jars. The display usually lasted between 20 and 40 seconds, and was not seen except at the feeding station.

The display was successful in all cases seen, in that the individual using it gained access to the feeding-jars although, in some instances, it is possible that the larger bird may have already satisfied its hunger. Further study of wattlebird groups under natural conditions is needed to determine how variable and common the display is within the species.

Many of the postures assumed by the birds during this display are typical dominance and submissive gestures (Marler & Hamilton 1966) – for example, the larger bird standing upright while the smaller avoids direct gaze and lowers its head. Wing-fluttering was the most conspicuous element of the display. Lorenz (1967) suggested that wing-fluttering in adults is an adaptation of infantile begging behaviour, with the object of reducing aggression. In some honeyeaters, such as the Yellow-tufted Honeyeater *Lichenostomus melanops,* it is more pronounced in adults than in young (Wakefield 1958). Honeyeaters have incorporated wing-fluttering into a wide range of behaviours, including greeting (Immelmann loc. cit., Wakefield loc. cit.), distraction (Chisholm 1934, Bourke 1955) and copulation displays (Rooke 1979; pers. obs.).

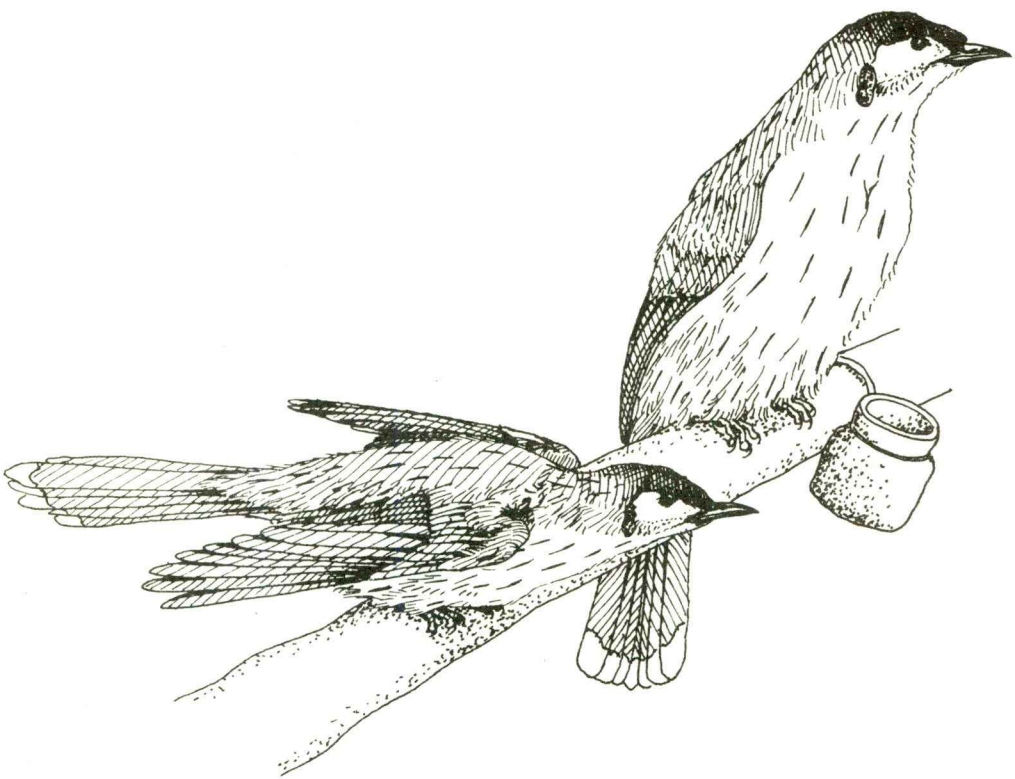


Fig. 1. Sketch illustrating appeasement display in Red Wattlebirds.

Other aggressive acts between group members were also recorded. These included displacements (n=16) and fighting (n=3). I never saw interspecific aggression at the feeding station even though another species of honeyeater (White-plumed Honeyeater *Lichenostomus penicillatus*) occasionally visited the jars.

I thank T.R. Lindsey for his helpful criticism of an earlier draft of this paper.

REFERENCES

Bourke, P.A. 1955. Elementary bird study. Perth: Paterson Brokensha Pty Ltd.

Brown, J.L. 1975. The Evolution of Behaviour. New York: W.W. Norton & Co. Inc.

Chisholm, A.H. 1934. Bird wonders of Australia. Sydney: Angus & Robertson.

Immelmann, K. 1961. A contribution to the biology and ethology of Australian honeyeaters. J. fur. Ornith. 102: 169-207.

Lorenz, K. 1967. On aggression. London: Methuen & Co. Ltd.

Marler, P. & W.J. Hamilton. 1966. Mechanisms of animal behaviour. New York: John Wiley & Sons Inc.

Officer, H.R. 1967. Australian honeyeaters. Melbourne: Bird Observers Club.

Rooke, I. 1979. The social behaviour of the honeyeater *Phylidonyris novaehollandiae*. Ph.D. thesis, University of Western Australia. RAOU Microfiche Series, Number 3, Melbourne.

Wakefield, N.A. 1958. The Yellow-tufted Honeyeater with a description of a new subspecies. Emu 58: 163-194.

D.C. McFarland, Zoology Department, University of New England, Armidale, NSW 2351.

FOREST RAVENS IN COASTAL NEW SOUTH WALES

S. J. S. DEBUS

This paper further delineates the distribution of the Forest Raven *Corvus tasmanicus* on the north coast of New South Wales, as reported in Debus (1980). Observations aimed at determining the northern and southern breeding limits were made in the latter half of 1982, and in January 1983.

SOUTHERN LIMITS:

An adult Forest Raven pair with three dependent fledgelings were observed at Mungo Brush, Myall Lakes National Park in January 1983. The Australian Raven *C. coronoides* is the common species to the south at Hawk's Nest; resident adult pairs of this species were observed north almost to Mungo Brush, and also on the western side of The Broadwater at Bombah Point. Thus Mungo Brush would indeed appear to be the southern breeding limit of *tasmanicus*.

NORTHERN LIMITS:

Observations of Rorest Ravens to the north of South West Rocks were made as follows.

Scotts Head, August 1982 – an adult performing what appeared to be a display flight about 50 m in the air, flying in a wide arc and calling with the throat hackles erect. Another pair occupied the adjacent territory to the north.

Forster Beach, between Scotts Head and Nambucca Heads, November 1982 – an adult pair showing obvious territorial behaviour, including fiercely defending the area against White-bellied Sea-Eagles *Haliaeetus leucogaster*.

Valla Beach, between Nambucca Heads and Urunga, January 1983 – an adult pair with two dependent but fully grown fledgelings. The two fledgelings were observed with 8 x 40 binoculars at very close range (c. 10 m), and clearly showed their large size, massive bill and bare pink edges to the inter-ramal area. This latter feature was clearly less extensive than in *coronoides*, but more so than in the remaining *Corvus* species. The two birds gave several deep alarm barks before flying off, while one adult planed overhead, characteristically raptor-fashion. This represents an extension of the previously known breeding range of over 30 km.

Hungry Head, Urunga, January 1983 – one bird, possibly vagrant, flying steadily along the beach. It approached from the north and continued southwards, giving a few contact calls only.

It thus appears that the northern breeding limit of the coastal Forest Raven population is somewhere just south of Urunga. The only corvid so far identified at Urunga, and on all beaches surveyed from the Bellinger River estuary northwards, is the Torresian Crow *C. orru* (localities checked include North Beach, Sawtell, Coffs Harbour, Moonee Beach and Red Rock).

Despite persistent reports of Australian Ravens on the north coast of New South Wales, my own surveys indicate that it is absent from the coastal plain from about the Hastings valley northwards. Misidentifications are understandable because of the occasional longer territorial calls of Torresian Crows, but accuracy is desirable if changes in the distribution of the various species are to be monitored. Interaction between the three species is of some interest, and has been discussed elsewhere (Debus 1982).

Reports of Forest Ravens in coastal New South Wales have met with some scepticism, and it has even been suggested that a new species may be involved. However there is no discernible field difference (physical or vocal) between the birds on the coast and those on the tablelands. Admittedly their distribution is peculiar (tablelands and escarpment and sublittorial zone, but apparently not the connecting country), but it is probably a result of major changes to the landscape coupled with competition from more pioneering congeners.

The coastal Forest Raven population appears to require stretches of reasonably undisturbed beach, backed by a substantial strip of forest (which may act as a buffer against the other species). Hence it is hardly surprising that its range limits coincide with major breaks in suitable tree cover– extensive heathland south of the Myall Lakes system, and past sand mining along North Beach where the natural vegetation has been replaced by a low growth of *Casuarina,* Bitou Bush and other scrubby species. The Western limits of this population also coincide in most places with the boundary between sublittoral forest and cleared farmland; this forest does not extend unbroken for more than a few kilometres inland in the area under discussion.

It is unlikely that a decayed specimen from Stewarts River (Lindsey 1982) was in fact a Forest Raven. Dead birds can cause identification problems if they are juveniles, for instance the hackles of Australian Ravens are undeveloped, and Torresian Crows may have dusky feather bases. G. Clancy (in litt.) has agreed that the specimen he found was most likely an immature Torresian Crow, which is the common breeding species at this locality (just north of Johns River township on the Pacific Highway). Coastal Forest Ravens have yet to be recorded as far west as the Pacific Highway.

ACKNOWLEDGEMENTS

I am grateful to G. Clancy for supplying additional information on the Stewarts River specimen.

REFERENCES

Debus, S.J.S. 1980. Little and Forest Ravens in New South Wales. Aust. Birds 15: 7-12.

Debus, S.J.S. 1982. Sympatry in the Australian corvids. Aust. Bird Watcher 9: 147-153.

Lindsey, T.R. 1982. N.S.W. Bird Report for 1981. Aust. Birds 17: 1-26.

Stephen J.S. Debus, P.O. Box 1015, Armidale, NSW 2350.

NOTICE TO CONTRIBUTORS

Contributors are requested to observe the following points when submitting articles and notes for publication.

1. Species, names, and the order in which they occur are to be in accordance with "Handlist of Birds in New South Wales". A.K. Morris, A.R. McGill and G. Holmes 1981 Dubbo: NSWFOC.

2. Articles or notes should be typewritten if possible and submitted in duplicate. Double spacing is required.

3. Margins of not less than 25 mm width at the left hand side and top, with similar or slightly smaller at the right hand side of pages.

4. No underlinings and no abbreviations except as shown in the examples.

5. Photographs should be glossy finish and not too small.

6. The *Style Manual,* Commonwealth Government Printing Office, Canberra (1966) and subsequent editions will be the guide for this Journal.

7. Diagrams should be on plain white paper drawn with india ink. Any lettering is to be 'professional style' or lightly pencilled.

8. Dates must be written "1 January 1975" except in tables and figures where they may be abbreviated.

9. The 24–hour clock will be used, times being written 06:30, 18:30 for 6.30 a.m. and 6.30 p.m. respectively.

10. Mr, Mrs, Dr are not followed by a full stop.

11. In text, numbers one to ten are spelt; numbers of five figures or more should be grouped in threes and spaced by a thin gap. Commas should not be used as thousands markers.

12. References to other articles should be shown in the text—'...B.W. Finch and M.D. Bruce (1974) stated...' and under heading

REFERENCES

Finch, B.W. and M.D. Bruce 1974 The Status of the Blue Petrel in Australian Waters Aust. Birds **9**, 32–35

13. Acknowledgements to other individuals should include Christian names or initials.

Vol. 17, No. 4 June, 1983

AUSTRALIAN BIRDS

CONTENTS

Registered by Australia Post — Publication No. NBH0790

Printed by Printwrite, 107 Walker Street, North Sydney. 929 6500