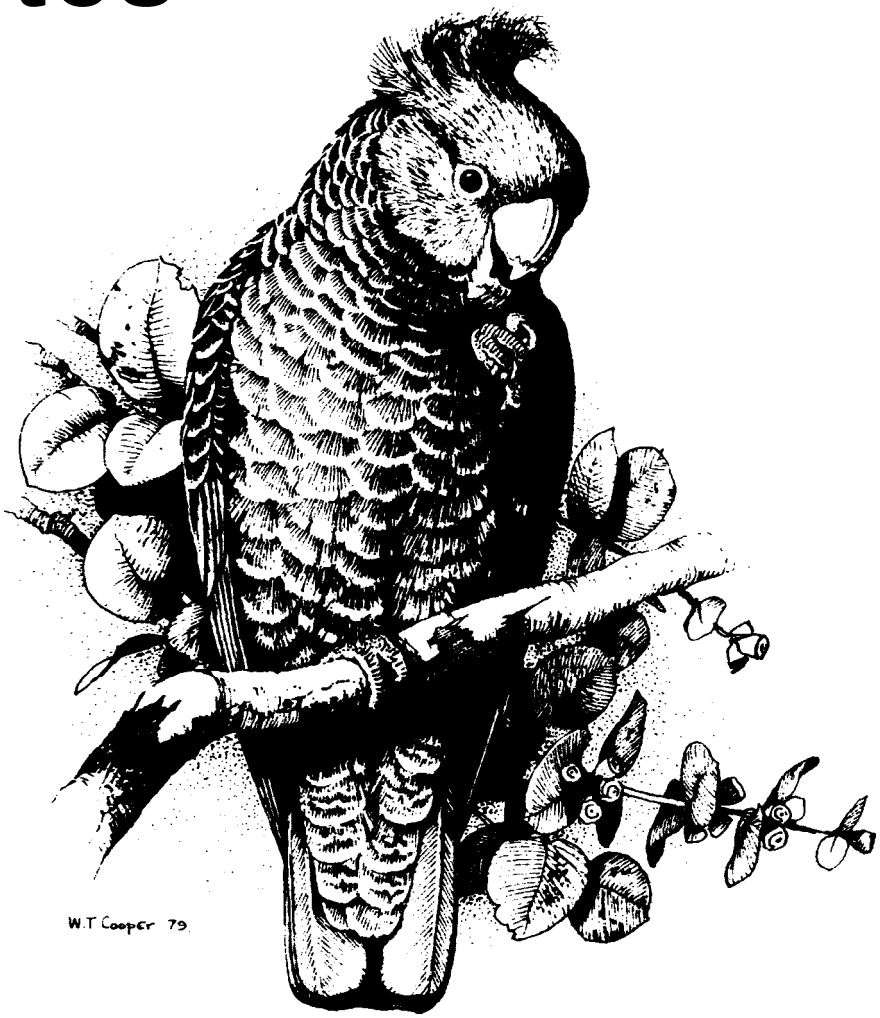
canberra bird notes

ISSN 0314-8211

Volume 25
Number 2
June 2000



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COOPERATIVE BREEDING BY DUSKY WOODSWALLOWS

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From 1964-1967 a small population of Dusky Woodswallows *Artamus cyanopterus* was studied near Geary's Gap on the Southern Tablelands of NSW, where these birds were regular migrants. Of 25 nests that I followed, 17 hatched and 12 fledged young. While simple pairs tended most nests, at one nest four birds fed the young. Hidewatches at two nests showed high rates of feeding, especially where the four birds were involved.

Introduction

In an earlier paper on Black-faced Woodswallows *Artamus cinereus* (Rowley, 1999), **I** pointed out that there was a lack of information about woodswallows, despite their widespread distribution and conspicuous behaviour. A decade before that study I had watched a small population of Dusky Woodswallows *A. cyanopterus* at Geary's Gap; those observations were the basis for my comment in a review paper that *A. cyanopterus* were cooperative breeders (Rowley 1976). Apart from a note on an unbanded trio (Marchant 1988) there has been little supporting evidence since that time and so it is time that my statement was validated.

Study area and method

In the 1960s I lived on a farm at Geary's Gap, 24 km northeast of Canberra (35° 08' S; 149° 20' E) on the Southern Tablelands of New South Wales. The native woodland had been largely cleared for sheep farming and is well illustrated in Figure 4 in a paper on corvids (Rowley 1973), where the details of the climate over this period are also given.

By 1964 I had realised that Dusky Woodswallows were regularly returning to a particular area each year and therefore offered opportunity for study. Over the four years 1964-1967 my search efforts and observations varied as they were largely made opportunistically in the course of other work (Rowley 1973, 1978). Where possible I monitored the progress of nests from building until after the young had fledged. The few nests found with only one (first) egg were visited daily until hatching in order to measure the interval between laying the eggs and also their incubation time. Where the hatching date was known nestlings were measured at intervals in order to provide growth curves from which other nests with less complete histories could be aged and the date of lay estimated.

The location and substrate of the nests and the number of birds attending were recorded. Attempts to mistnet woodswallows were largely unsuccessful but nestlings were banded and on one occasion I managed to net seven of ten birds roosting in a cluster.

Results

Dusky Woodswallows were first seen at Geary's Gap in September each year and not after April. Where they spent the winter is not known - presumably somewhere warmer! That the same birds returned to the same place each spring suggests that this movement may be a true migration. This species is monomorphic and so one cannot tell male from female in the field except by behaviour. Young fledge with a distinctive mottled body plumage that gradually disappears during the next four months, at the end of which time they resemble adults; a juvenile was only faintly mottled on the head at 131 days old.

Nesting

I never found the nest for three of the 31 breeding attempts that were monitored because the young had recently fledged when I located them nowhere near a nest. Of the 28 known nests, nine were placed in Yellow Box *Eucalyptus melliodora* (crotches or epicormic shoots), five were in Red Stringybark *E. macrorhyncha* (crotches or holes where limbs had broken off) and 14 were in various dead timber that I could not identify (stumps, dead trees or fence posts). The height of the nests varied from less than a metre to more than ten metres as shown in Table 1.

Table 1

Height (m) of Dusky Woodswallow nests at Geary's Gap, 1964-1967

Substrate	*Number*	*Mean (m)*	*s.d.*	*range (m)*
Yellow Box	9	5.05	2.88	1.2-10.7
Red Stringybark	5	3.72	2.52	0.6-7.6
Dead Wood	14	3.35	2.12	0.9-6.0
Total	28	3.96	2.48	0.6-10.7

Table 2

Breeding attempts by Dusky Woodswallows at Geary's Gap, 1964-67

Number of nests

Year	*Built*	*Laid in*	*Hatched*	*Fledged*
1964	7	5	3	3
1965	10	7	5	4
1966	9	9	5	2
1967	5	4	4	3
Total	31	25	17	12

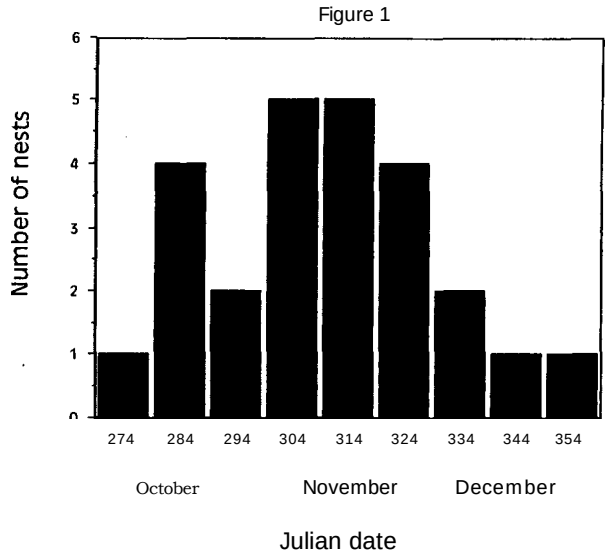

Figure 1

Estimated date when the first egg was laid by Dusky Woodswallows in 25 clutches, at Geary's Gap, 1964-1967. The Julian date shown below the columns is the date at the start of the interval.

Six nests were never laid in. Figure 1 shows the actual and estimated dates when the first egg was laid in 25 clutches and shows that laying took place between October and December; the data were insufficient to compare years. Unless one or more birds were banded it was not always easy to tell how many birds were attending a nest. Of the 31 nesting attempts 14 were by simple pairs, one by a trio and one by four birds; at 15 attempts I was unable to be sure. Several of the later nests were thought to be relays after the first nest had failed, but without banded birds **I** could not be certain.

Both members of a pair took part in building the nest, each in turn bringing single pieces of grass, a twig or rootlet. A bird squatting in the bowl shaped the nest by pressing its breast against the rim, moving round as it did so. Most nests were cup-shaped and placed in a variety of positions that allowed easy access for fast-flying birds to land and depart. Although epicormic tufts and the cuts in bark made by ring-barking were used, most nests were placed in a depression in the top of a stump, trunk, or fencepost that allowed a secure foundation. Nests were unlined and so frail that, if viewable from underneath, the eggs were visible through the bottom! The open nature of these nests was emphasised several times during hidewatches when a sitting bird rapidly left the nest to catch an insect that flew by, returning to eat it or to feed nestlings. Both members of a pair incubated, brooded and fed the nestlings.

Table 2 shows that 17 of 25 clutches hatched and that 12 of these fledged young (3x1, 3x2, 6x3). At ten nests the eggs were counted repeatedly so that I was sure that the clutch was complete - seven were of three eggs and three of four, a mean of 3.3 eggs. Eggs were laid in the morning on successive days. With two of these clutches the date of laying the third (and final) egg and the date when it hatched was known; one was incubated for 14 days and the other for 15 days. Five broods were monitored from hatching to fledging and gave nestling periods of 16,18,18,19, and 19 days, with 2, 3, 3, 3 and 1 nestlings respectively.

Nestling growth

At four nests where the hatching of the nestlings was known, I measured them several times and prepared graphs for the increase of Mass and the growth of the flattened Folded Left Wing (FLW) and Central Rectrix against known age (Figure 2). Regression lines from these data allowed nestlings that were not found until well after they had hatched, to be aged sufficiently accurately for me to estimate the date when the first egg of that clutch had been laid.

Mass increased regularly until the nestling was 12 days old when it reached an asymptote around 30 g; the regression to that age was :

$$y=3.0574 + 2.0078x; R^2=0.898$$

The wing grew linearly throughout nestling life, reaching 70 mm by the time they fledged:

$$y=1.9185 + 3.8287x; R^2=0.937$$

Fledglings can fly weakly when they leave the nest and continue to grow their flight feathers for another week before becoming competent; adult FLW exceeds 120 mm. The tail did not begin to grow until the nestling was seven days old; at first growth was slow but from nine days old growth was linear and continued beyond fledging; the regression from 9 days was:

$$y=-21.179 + 2.5276x; R^2=0.884$$

Hidewatches

I carried out hidewatches at two different nests for a total of 714 minutes (l 1 hr 54 min); the feeds delivered to nestlings at different ages are given in Table 3.

At nest 614 the male of the pair had been banded the previous year and I had seen him courtship feed and copulate with his partner. The female was unbanded, which meant that recognition of each attending bird was certain since there were only the two. The three nestlings were watched from when they were 9 to 18 days old.

At nest 701 four birds attended three nestlings. Two of the attendants were unbanded, one of which was the breeding female; how much the second unbanded bird contributed is not known and is included in the total under `female' in Table 3; on 15 occasions the visit was so quick that the bird was not identified. However, the male from nest 614 of the previous year and one of the progeny from 614 were present and already banded; the latter provided 38% of the feeding visits. The very high feeding rate on 14 November was not only due to the contributions by the

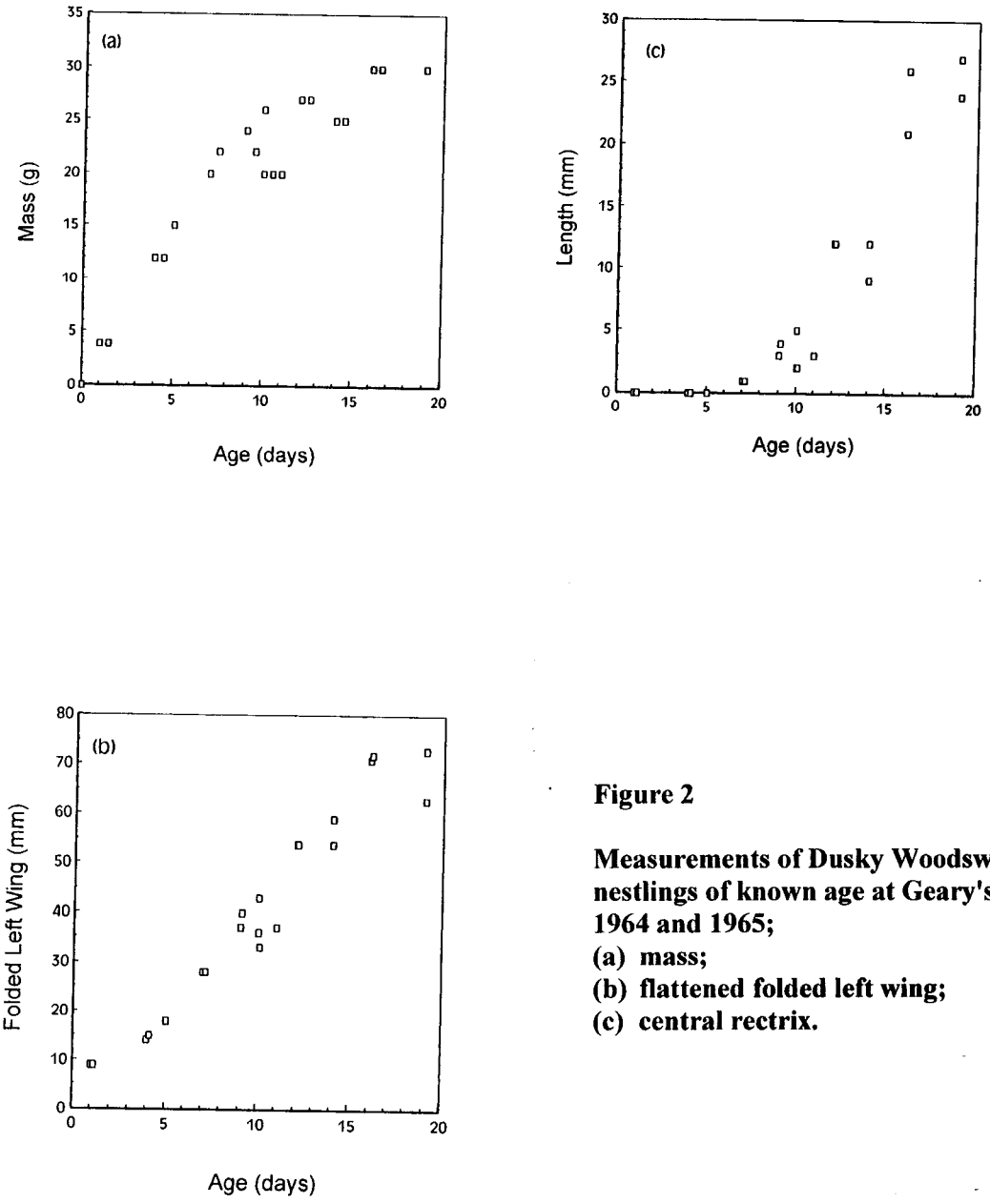

Figure 2

Measurements of Dusky Woodswallow nestlings of known age at Geary's gap, 1964 and 1965;
(a) mass;
(b) flattened folded left wing;
(c) central rectrix.

helpers; the prey that was caught that day was obviously abundant, but very small and unrecognizable in the bill.

Calling

Dusky Woodswallows have a variety of simple calls that convey mood by differences in rate and intensity. Those that I recognised were :

1. a Flock Flight Call, given when a number of birds were flying in transit often at a height of about 100 m - 'tweet-tweettweet' or `tweedle-deedle-dee';
2. the Mobbing Call, used to summon support attacking a predator - a loud two-note 'kee-oo';
3. the Gathering Call, used when assembling before going to roost, was very similar to the mobbing call but not so urgent - 'quip-quip';
4. the Alarm Call, a loud sharp `que-que-que', typically given if danger approached a nest with young which responded by crouching low and still;
5. parents approaching their nest with food gave a characteristic call - 'weoo-weoo weoo-weoo' that alerted the nestlings.

Table 3

Feeding of nestlings and removal of faecal sacs (in parentheses) by Dusky Woodswallows at Geary's Gap

Nest	Date	Mins'	Age	Feeds	Rate`	M	F	Helper	?
614	16.12.66	65	3x 9d	17	14.8	9 (3)	8 (l)		
17.12.66		45	3x 10d	13	16.0	7 (l)	6 (l)		
	20,12.66	59	3x13d	15	14.2	5 (-)	10 (2)		
	22.12.66	68	3x15d	23	19.4	13 (l)	10 (-)		
	24.12.66	97	3x17d	22	13.0	7(2)	15(l)		
	25.12.66	67	3x18d	21	17.9	10 (2)	1	1	(l)
	Totals	401		111	15.7	51 (9)	60 (6)		
46%								5 4 %	
701	11.11.67	134	3x12d	35	15.2	10 (l)	I 1 (l)	12 (1)	2 (1)

' duration of observation from first to last feed

[2] rate of feeding = number of feeds less one divided by duration of observation in hours.

[3] ? = quick visit by an unidentified bird.

[4] the nestlings fledged on 17 Nov. but were still fed by all birds.

Food

Woodswallows are very versatile foragers. With their wide gapes, these fast-flying birds took most of their food in flight and included wasps, bees, dragonflies, moths and small unidentifiable flies. Other prey was taken on the ground either by pouncing from a standing position (ants) or snatching when the prey was observed from a perch and swooped on (centipedes, crickets and grasshoppers). Beetles and spiders were snatched from branches or webs. On cold windy days flying prey was scarce and I have watched a woodswallow plundering slow moving meat ants at their nest. On another occasion they perched on a variety of weeds about a metre tall left standing in a fallow paddock and from there flew brief sorties to the ground taking insects. If a woodswallow captured prey that was too large to swallow, such as a centipede or grasshopper, it was held to the perch under a foot and torn into edible pieces.

I once encountered a flock of 15-20 Dusky Woodswallows foraging in a copse of flowering Brittle Gum *E. mannifera maculosa* at Geary's Gap. 1 was unable to locate any banded birds, but I watched several individuals clinging to leaves in the canopy and apparently eating something. At that time it was not generally known that woodswallows had brush tongues (McKean, 1969) so these birds could have been feeding on nectar. After the birds had moved on I examined several leaves and found a lot of scale/lerp on them so they may have been feeding on these; they certainly were not attempting to catch the insects that were abundant.

Courtship feeding

Courtship feeding in Dusky Woodswallows has been recognised for some time (Rowley, 1951). The recipient female flutters her wings and opens her beak when she sees the male approaching; he quickly feeds her and flies off. Unlike the mating display where the tail is fanned and rotated, the tail remains closed during courtship feeding. Occasionally a member of the pair may feed the partner that is incubating or brooding, but this is not the usual procedure since both partners incubate and brood.

Copulation

Copulation is brief but is preceded by an elaborate and beautiful display. Either the male or the female may initiate the display when the birds are five to ten metres apart, often in different trees. One bird part-opens its wings and begins to wave them in time with the rotation of the spread tail, about 10 times in 15 seconds. The partner very soon joins in an identical display which may last for more than a minute until the pair appears to have achieved synchrony. The male then flies to the female and briefly mounts her. Copulation was seen seven times and did not exceed five seconds duration.

Aggression

Despite their sociability when flocking or roosting, Dusky Woodswallows defended a territory within about 50m of their nest, from which trespassing conspecifics were rapidly repelled. Woodswallows are very bold birds as befits their exposed lifestyle spending

most of their time conspicuously perched in places remote from cover. They ferociously mobbed potential predators including Brown Falcon *Falco berigora*, Nankeen Kestrel *F. cenchroides*, Laughing Kookaburra *Dacelo novaeguineae*, and Australian Raven *Corvus coronoides.* They also drove off White-browed and Masked Woodswallows *A. superciliosus* and *A. personatus* and a White-winged Triller *Lalage sueurii.*

I attempted to take advantage of this ferocity by placing a stuffed owl near a nest and close to a mistnet but although most birds attacked the dummy only one was ever caught. Later, when studying *A. cinereus, I* discovered that to place the net near the nest whilst banding the nestlings was a very successful technique.

Defence

On two occasions I watched a perched woodswallow that had seen a raptor approaching and, rather than fly and offer a target, it lowered itself to the side of the branch furthest away from danger and clung there until the potential predator had passed over; it then quickly resumed its original position. I have also seen this behaviour with a Little Woodswallow *A. minor* in Queensland (unpublished observation).

Bodycare

Bodycare is important for a fast-flying bird and woodswallows frequently sit side by side preening themselves and their neighbours. Allopreening is sought by lowering the head and offering the nape to be preened by another bird. Their long wings receive frequent attention and because of their length each primary is grasped in the bill and drawn through, presumably reconnecting misplaced barbules. This wing preening is usually carried out apart from other birds as it requires space.

Roosting

Woodswallows like to roost in a tight cluster every night, a behaviour reviewed by Hindwood (1956). They usually use the same site for several nights in succession unless disturbed or the wind changes direction. Most avian roosting is scantily described because the final move to the chosen site usually takes place in the very last stages of daylight when it is often hard to follow the birds. Dusky Woodswallows begin to gather about ten minutes before they move to roost; they call a characteristic sharp 'quip-quip' call which is very similar to their mobbing call, and suddenly fly silently to the roost site when it is nearly dark.

The urge to roost communally is very strong in all woodswallows that have been studied. During this study the strength of this attraction was shown when the four attendants at nest 701 deserted their 12-day-old, well feathered nestlings leaving them unguarded all night while they joined a cluster more than 100 m away. The brood survived and was netted, when 50 days old, in a cluster of ten, three of which escaped. One of the others netted had been the helper at 701. This was the only time that I succeeded in netting roosting birds; my other four attempts at different sites all failed when the birds exploded before I

got near. A still moonless night is essential for this netting.

Roost sites were varied, such as a crotch at 7.5 m in a Red Stringybark, or behind a piece of loose bark at 5 m on a dead Yellow Box. Such sites were often more than 50 m from the gathering tree. My observations show that communal roosting in woodswal lows occurs throughout the breeding season as well as during the rest of the year.

Discussion

Dusky Woodswallows are fast-flying insectivores that spend much of their time trawling for prey high above the vegetation and therefore have very large home ranges which they appear to share amicably with other members of the local population. At the same time they vigorously defend an area within 50 m of their nest against conspecifics and other intruders. They are very bold and frequently swooped close to my head when I was handling nestlings, even brushing my hair!

This two strata view of their environment is reflected in their unusual sociability. All species of woodswallow that have so far been studied cluster to roost in a scrum at night and even occasionally by day when the weather is particularly cold. The urge to join a roosting cluster is very strong, as was shown at nest 701 where the attendants deserted the 12-day-old nestlings to join a roost. It is very likely that these clusters provide communal thermoregulation and thereby save energy that would otherwise be spent keeping warm, as has been so elegantly shown for groups of Green Woodhoopoe *Phoeniculus purpureus* that need shared body heat to survive their nightly roost in a shared hollow (du Plessis & Williams 1994).

This opportunistic study has shown that Dusky Woodswallows can and do breed cooperatively, but that most nests are attended by pairs. That the latter managed successfully to raise broods of up to three suggests that cooperative breeding is not essential in this species (contra *Corcorax*, Rowley 1978). At one nest where more than a pair helped to raise nestlings, at least one of the helpers was the progeny of the previous year. This suggests that extended parental care, combined with the sociable roosting habit and presumably migration as a flock, leads to a persistence of familial ties and, in some cases, to a bird helping to raise young in a brood of which it is not a parent. Since there was no shortage of nest sites presumably these helpers had either failed to find a partner or were not yet sexually mature.

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Corrigenda to past Annual Bird Reports

Over the years various processing errors have occurred during the compilation and analysis of Garden Bird Survey (GBS) results for inclusion in Annual Bird Reports (ABRs). One earlier notification of a significant error was published in *Canberra Bird Notes (CBN14:* 48). More errors have recently been detected, most of which are minor and not worth individual mention. However, a particularly severe error concerning the data for common birds for 1989-90 deserves comment. Somehow, the processing corrupted the records for birds with any observations of more than nine individuals per observation (i.e. double-digit numbers). This occurred for the first 18 of the 61 charts then processed for that year. The error maintained the correct sequence of numbers, but randomly split and recombined digits of bird count data over successive weeks. A typical example is: '15, 9, 8, 7, 22, 6, 8, 9, 10' became 'l, 5, 9, 8, 72, 2, 68, 9, 10'. This processing error not only corrupted count values, but also resulted in the shuffling of values along the weeks, so typically the results for June and even some of May simply fell off the system, being replaced with corrupted data from earlier weeks. As a result, all the statistics and graphs given in the ABR for 1989-90 in *CBN17(2):17-71* (1992) for common birds are wrong, and the comparisons in the following year's ABR, *CBN* 18(4):53-108 (1994) are also wrong. These errors plus all minor ones detected were rectified prior to re-analysis of the data for the recent publication *Birds of Canberra Gardens,* and for the detailed and comprehensive report on the GBS that I am currently writing.

Philip Veerman

OBSERVATIONS ON THE SPREAD OF THE SATIN BOWERBIRD INTO CANBERRA SUBURBS

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The recent article by Holland (1999) describes the changes in status of the Satin Bowerbird *Ptilonorhynchus violaceus* in the Chapman area of the ACT since the early 1980s. The purpose of this additional article is to bring together what information is available on the spread of this species into other ACT suburbs. Much of this is derived from the detailed records kept by members participating in COG's Garden Bird Survey (GBS). The ability to analyse this information has only become available through the recent compiling of all the GBS count data into a database. In addition to the recent COG publication *Birds of Canberra Gardens* (COG 2000) a report that puts the GBS records into context is underway (Veerman, in preparation).

Early suburban records

Old bird lists for Canberra, for example the one published by White (1998) for Red Hill, do not include the Satin Bowerbird, nor was it listed in *Birds in Canberra Botanic Gardens* (Department of the Capital Territory 1974). Indeed it appears that the first published record of the Satin Bowerbird in suburban Canberra is in *Status of the birds of Canberra and District* (Anon, 1976) which states 'The only records of the Satin Bowerbird] in Canberra itself have been at the Yarralumla nursery.'

The 1977-78 Annual Bird Report (ABR) (Clark and Lenz 1978) said of the Satin Bowerbird, ' A bird unsuccessfully attempted to breed in the Botanic Gardens at the end of Nov (KT). The first breeding record of this species in the Gardens.' The following year's ABR (Clark and Lenz 1980) records 'Exceptional Record: 1 breeding BoG (information from rangers).' We have been able to confirm (Grahame Clark, personal communication to JH) that this actually refers to nesting (a green bird built a nest that was subsequently predated by Pied Currawongs) rather than bower building as might have been suspected from the subsequent history of the species in Canberra. Apparently at the time it was not considered such an extension of its breeding range as there had been reports of nesting in Yarralumla, but we have only been able to find the published record of presence above. Interestingly in spite of the enormous observer effort at this site, the latest bird list, dated May 1997, issued by the Botanic Gardens does not include this species.

It appears the first documented record from Canberra home gardens was that in the 1980-81 ABR (Lenz, 1982): 'Record from suburbs: 4+/9 August edge of Chapman/Rivett (JHol).' This is the same record noted in the earlier article (Holland 1999) as the first for this area. Nearly five years elapsed before the next sighting in this area, actually in the GBS site (see below), although in the interim it had

become well known that the species was regularly seen in Duffy, in line with early GBS records.

The 1981-82 ABR (Taylor 1983) carries the following interesting Satin Bowerbird record by John Calaby: 'Unusual suburban record: (no date) female or immature feeding in Hawthorn with King-Parrots in Yarralumla.' The observation is likely to have occurred late autumn/early winter in line with the known hawthorn fruiting period, the known fondness of the Satin Bowerbird for ripe hawthorn fruit (Holland 1999), and the likely presence of the parrot. All these observations predate the first records collected through the GBS.

Garden Bird Survey (GBS) records

Many Satin Bowerbird records have been gathered by participants in COG's GBS. The description below is an attempt to highlight when the spread of the species into the different Canberra suburbs occurred, and also to document the increasing abundance and summer sightings. While this article gives an indication of maximum numbers, readers will need to refer to the database to obtain individual records. Note that in this paper, `weeks' are defined in the same way as in COG's ABR: for example, the 'last week of October' is 30 October to 5 November.

Early GBS records

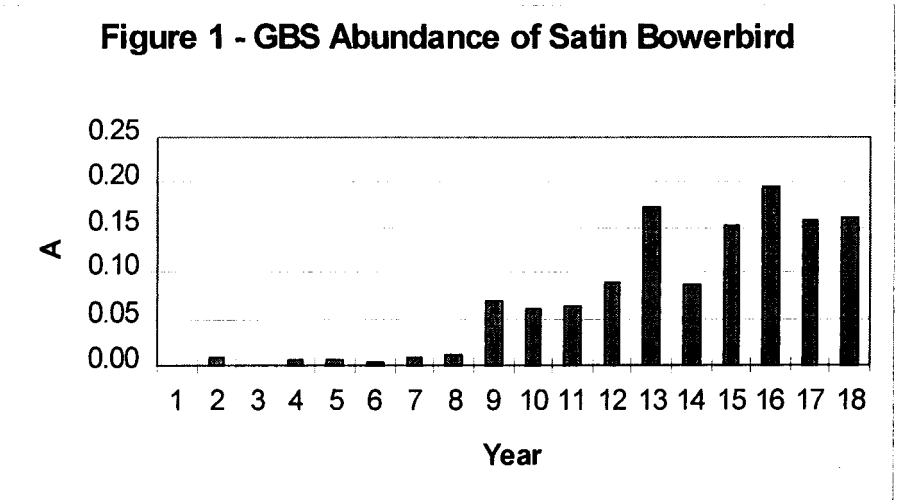
No Satin Bowerbirds were recorded in the first year of the GBS (1981-82). The first GBS records of the Satin Bowerbird are from Peter Roberts' site in Duffy for 1982-83, with between one and six birds observed between the last week of August and the last week of October, and the maximum, six birds, seen in the first week of October 1982. Peter also noted two birds in the last week of June 1983.

For 1983-84, there were, only two observations from his site: one bird in the middle week of October 1983; and three in the fourth week of April 1984. Unfortunately there are no further records from this site as Peter moved away, though in 1984-85

Lyndal Thorburn observed single birds in her Duffy garden in the first and second weeks of June 1985. She also kept records for this site in 1985-86 but recorded no Satin Bowerbirds.

The Thorburn record was a month later than the first GBS observation of Satin Bowerbirds in Chapman, the eight birds recorded in the first week of May 1985, as described in the earlier article (Holland 1999). Shortly after, in the third week of June, Graham Browning observed a maximum of seven birds in his Chapman site, about a kilometre away.

Interestingly there is also a GBS record from Deakin of one bird in the last week of June 1985 by P. Mooney, this being the only Satin Bowerbird record on the GBS database from this suburb until a further record in October 1997 (see below). However, the breeding record from Deakin in the 1996-97 ABR (see also below) should be noted.



For the next four years numbers remained at much the same level with some year to year fluctuations (see Figure 1) and are summarised in Table 1.

As Table 1 shows, the database for 1985-86 only contains observations from Wayne Gregson's site in Duffy, which was surveyed for one year only, and for the two Chapman sites. There are fewer records for 1986-87 from only two sites, including for the first time a record from Richard Thackway in Holder.

For 1987-88 there are Satin Bowerbird records from four sites, including the first records from Maurice Sexton in Duffy. The GBS database also contains an interesting record of Bryan FitzGerald's in Ainslie. This is the only observation for this suburb or others in central Canberra, excluding the Botanic Gardens. There are records from four sites for 1988-89, all in Weston Creek but including one new one, that of B Crone in Chapman. While Maurice Sexton noted only two birds in mid-August 1988, they were much more common in his site in May-June 1989: a maximum of 12 birds was seen in the second week of May.

GBS numbers increase (1989-90 to 1992-93), and increase further (1993-94 to 1998-99)

Numbers first increased significantly in 1989-90 (Year 9 in Figure 1) then plateaued for the next three years. Numbers were highest first for Duffy/Holder, then Chapman, followed by the first GBS sightings for new suburbs, in the order of Fisher, Kambah, Yarralumla and Waramanga. January-February 1990 also saw the first summer GBS observations which peaked in 1992-93. The following box provides further details of the spread of the Satin Bowerbird from 1989-99.

FURTHER DETAILS OF SPREAD OF THE SATIN BOWERBIRD, 1989-1999

1989-90: Records from 9 GBS sites. New sites in Duffy/Holder (Hugh Possingham and Margaret Aston) First records from Fisher (John Bissett) — 1 bird (Mar week l); and Kambah (Philip Veerman) - 1 bird (Apr week 1). First summer observations Ann McKenzie (Chapman) - 6 birds (Jan week 5) and 8 (Feb week 1).

1990-91: Records from 9 GBS sites, including for the first time Yarralumla (R & C Cannon) — 1 bird (Jan week 2); 2 mid-Mar; 1 early Apr; and Waramanga (Ellen Tulip) — 1-4 birds, May/Jun. Chapman numbers higher particularly in June 1991; most observations from Hugh Possingham's site in Duffy. Summer occurrences R & C Cannon (see above); Maurice Sexton — 1 bird (Feb week 2); John Bissett — **1** bird (Feb week 3).

1991-92: Records from 9 GBS sites; includes two more Kambah sites (Steve Wilson, David McDonald). Summer sightings: Fisher (John Bissett) - 1 bird (Dec week l); 2 birds (Feb last week); Graham Browning - 1 bird (Feb week 5). Highest numbers of birds: Graham Browning - 9 (mid-Jul); John Bissett - 8 (early Jun). Numbers otherwise unremarkable.

1992-93: Records from 9 GBS sites. Highest numbers of birds: Graham Browning - 12 (Jul week 5), 10 (Jun week 1); Jack Holland - 15 (Jun week 1). For the first time multiple summer observations in three gardens: Fisher (John Bissett) - 1 bird (mid-Dec), l-5 (Jan-Feb); Yarralumla (R & C Cannon) and Chapman (Ann McKenzie) — l-3 birds (Jan-Feb).

1993-94: Records from 12 GBS sites. Summer occurrences: Chapman (Jack Holland), Fisher (John Bissett, Harvey Perkins) — 1-3 birds regularly all summer; Yarralumla (R & C Cannon); Duffy (Maurice Sexton) - 1 bird Dec (week *5);* Chapman (Ann McKenzie); Pearce (Catherine Bennett). Highest numbers of birds: Fisher (Harvey Perkins) 17 (mid-Jul); Duffy (G Hill) - 12 (mid-Aug; Sep week 1).

1994-95: Records from 8 GBS sites; one new in Waramanga (John Hardwick). Highest number of birds 9. Few summer observations: Duffy (Maurice Sexton) — 1 bird (mid-Dec, Jan), 2 (mid-Feb); 1 bird (end Jan) Holder (Margaret Aston).

1995-96: Records from 6 GBS sites; regular in only 4; highest number of birds 9. Few summer records: Chapman (Jack Holland) - 1 bird(Jan week 2), 3 Feb week 2); Weston (Jenny Bounds) - 1 bird — first GBS record for suburb (Feb week 2).

1996-97: Records from 10 GBS sites; numbers highest so far; 10 birds max. First GBS records from Hughes (Ian Anderson) - 1 bird (March week 2); Stirling (Delia Johnston) — 1 bird (May week 5). Summer records Chapman (Jack Holland) — l-4 birds; Kambah (Harvey Perkins) — 1 bird (Dec week 3).

1997-98: Records from 9 GBS sites; 10 birds max; overall numbers down. First GBS record from Deakin (David Rosalky) - 1 bird (October week 5). Summer observations from five sites: Chapman (Jack Holland); Weston (Jenny Bounds) - 2 birds (Jan week 1); Pearce (Shirley Kral) — 2 birds (Feb week 3).

1998-99: Records from 9 GBS sites; one new (Laing, Waramanga). Max 14 (last week Jul) Chapman (Jack Holland). Few summer records: Yarralumla (R & C Cannon) - l-3 birds Jan-Feb; Chapman (Jack Holland) - 1 bird occasionally; Holder (Margaret Aston) - 2 birds (Jan weeks 1, 2); Kambah (David McDonald) - 3 birds (last week Jan).

Table 1 Observations of Satin Bowerbirds from GBS 1985-86 to 1988-89

Year	*Suburb*	*Observer*	*Numbers of observations*	*Month (GBS week)*
1985-86	Duffy	W Gregson	5 (1); 1(2)	Jul (4) to Sep (3); May (5
	Chapman	J Holland	1 (2)	Sep (2)
	Chapman	G Browning	2 (3)	Aug (3); Sep (1)
1986-87	Chapman	G Browning	1 (1)	May (5)
	Holder	R Thackway	3 (1); 1(2)	Sep (2); Oct (1); Jun (5)
				Oct (4)
1987-88	Chapman	J Holland	4 (1); 1 (3)	Aug (2)to Jun (3); Sep (5)
	Duffy	R Thackway	3 (1-4)	Jul (3) to Aug (2)
	Duffy	M Sexton	1 (5)	Aug (5)
	Ainslie	B FitzGerald	3 (1)	Aug (1-3)
1988-89	Chapman	J Holland	1 (1)	Jul (5)
	Chapman	G Browning	1 (1)	Sep (3)
	Chapman	B Crone	1 (1)	Sep (1)
	Duffy	M Sexton	1 (2); 5 (1- 12)	Aug (3); May/Jun

Numbers for 1993-94 reached a new level, where they have largely stayed, except for 1994-95 (see Figure 1). The most summer observations recorded to date were in 1993-94, and have been rather irregular since that time. Over this period the first GBS Satin Bowerbird records were obtained for, in order, Pearce, Weston, Hughes and Stirling.

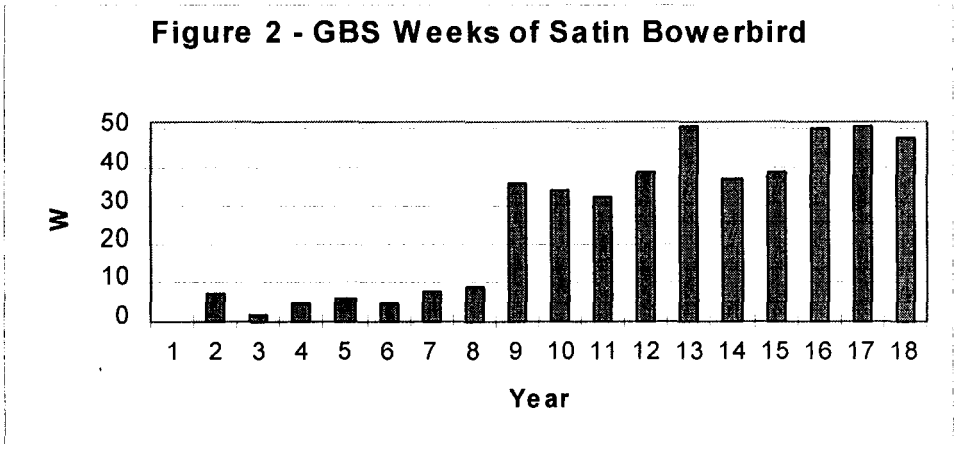
Summary of GBS data

From the above it is clear there has been a gradual movement of the Satin Bowerbird from its traditional wetter habitat in the mountains to the Canberra suburbs over the past 20 years. Historically the species did not seem to occur east of the Murrumbidgee River (Wilson 1999). Until recently it appears not to have been present at Mount Stromlo, where it is now thought to roost and from where it moves into the neighbouring suburbs early in the morning, particularly in winter (Holland 1999). Richard Mason (personal communication to JH) did not record them there in regular visits during 198185, though from visits since 1995 he now considers it to be common there. The ACT Atlas (Taylor and Canberra Ornithologists Group 1992) indicates only limited records and close to its then range.

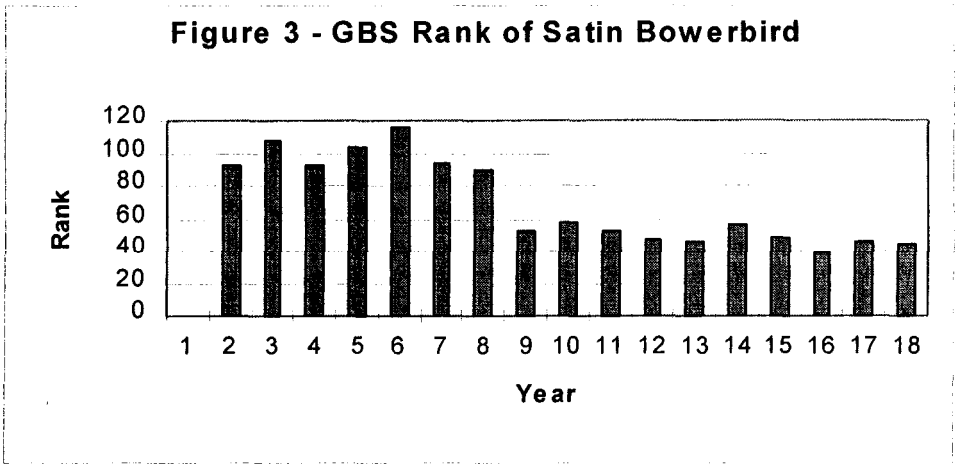
Apart from records in the Yarralumla Nursery and the Botanic Gardens in the 1970s, the Satin Bowerbird was not officially recorded in the Canberra suburbs until 1980. As Figure 1 shows, levels built up very slowly over the next decade, and with two exceptions (isolated observations from Deakin and Ainslie) the species was confined to the suburbs of Weston Creek. This was mostly in the suburbs of Chapman and Duffy (predominantly the former in the second half but with possible under

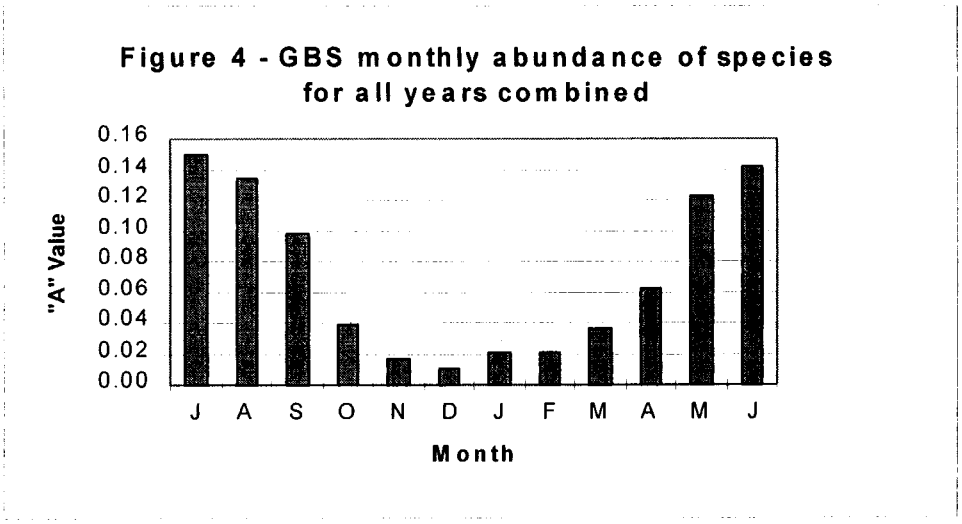
reporting in the latter, which at least anecdotally is the suburb in which they first occurred regularly). There is also an isolated record from Yarralumla in 1981-82.

As Figure 1 shows, the first real increase in numbers occurred in 1989-90, with a plateau for the following three years. Analysis of the data indicates that a big change occurred in observations from year 9 of the GBS. Figure 2 shows that for the first eight years the species occurred on less than ten weeks of the year, but from year nine there was a sudden jump and it has been observed on more than 30 weeks of the year since. No observer bias could explain this and in our view, the increased distribution, presence and recording rate have created the increased abundance measure in Figure 1.



Notes: Year 1=calendar year 1981-82; the A (abundance), W (weeks) and Rank values of the Figures are as defined in the GBS analyses in COG's Annual Bird Reports.





The data show there was at first a Satin Bowerbird expansion into Fisher as well as Kambah, followed by the first GBS records in Yarralumla and Waramanga in 1990-91. With the exception of 1994-95 numbers again increased dramatically from 1993-94, reaching their peak in 1996-97, with the first GBS records for Pearce in 1993-94, Weston in 1995-96 and Hughes and Stirling in 1996-97. The reducing rank of the species (Figure 3) clearly shows that the species has come progressively closer to the top of the list of Canberra gardens' most common birds.

What is also clear is that presence is not totally confined to the 'winter period' (see Figure 4). While observations were initially restricted to March to November, the first summer occurrences (December to February) were from Chapman in January-February 1990. Numbers over summer remained low until 1992-93 and peaked strongly in 1993-94, with very few records for this period in the following two years. An examination of Figure 4 indicates that the lowest abundance occurs in December, followed by November and January equally. Figure 2 shows that in recent years it has been observed nearly every week of the year.

Discussion

The above focuses very much on the results obtained from the GBS. While it gives a very clear indication of the gradual spread of this species into the suburbs of Canberra, the limitations of the GBS must be recognised. In particular it relies on a relatively small but dedicated group of observers whose reporting area may not be representative of the suburb as a whole.

This study highlights the difficulty presented by a lack of continuity in GBS records, especially for birds with restricted ranges. For some sites GBS records for only one or two years are available, and it is possible that bowerbirds would have been observed in other years. The great variability in

observer effort is discussed in more detail in Veerman (in preparation). Further, some suburbs in the more developed parts of Tuggeranong, such as Wanniassa, have had very few, if any, GBS participants (see COG 2000).

There are also relatively few records of the Satin Bowerbird in the early 1980s from Duffy, generally considered to be the first suburb where they regularly occurred. Neither are there any records from Rivett in which the first official sighting in a home garden was made, though over the past years one of us (JH) has regularly seen this bird species here (Holland, submitted). There are also few records from the neighbouring suburb of Stirling. Even in Chapman the distribution is patchy. Jean Whatman (personal communication to JH) has never seen the species in her garden, though this is not far as the Satin Bowerbird flies from John Bissett's garden in Fisher (where GBS records show it to be common) or Lincoln Place/Pelham Close Chapman where it is also known to occur regularly.

In Kambah the Satin Bowerbird regularly occurs on the western side of Drakeford Drive, with bower building in David McDonald's garden and up to six birds in August 1999 in Philip Veerman's garden. Yet they have rarely been recorded at the two sites (those of Steve Wilson and Harvey Perkins) on the eastern side of Drakeford Drive. While this suggests the main road is a barrier, it is intriguing to note they were not observed at the GBS site closest to the Murrumbidgee River Corridor, that of Hazel and Alan Wright at Gleneagles, until 5 May 2000 when two green birds were seen. This might be explained by the fact that the gardens are still relatively young there.

Therefore it is also relevant to consider other available records, including those obtained from several requests for information from COG members which were made during the writing of this article.

Records from other sources

Other sources were examined for Satin Bowerbird records from suburban Canberra, in particular the COG database and COG's published Annual Bird Reports. Feedback was also solicited from COG members.

Records from the COG database

Another major source of information is the COG database, which is different from the GBS database and contains records from the start of the ACT Atlas on 1 September 1986 (Taylor and Canberra Ornithologists Group 1992), some of which may the same as for the GBS database. While data collected since the end of August 1989 are also available, including from the start of the Birds Australia Atlas in August 1998, they are to date more limited than for the Atlas period.

Examination of the Satin Bowerbird records collected during the ACT Atlas period reveals they all came from grids west of, or on, the Murrumbidgee River except mainly for cells 114 (north of Duffy, Mt Stromlo) and 115 (most of Duffy, Rivett, Chapman, Narrabundah Hill and the western half of Holder). While this was within the range of the Satin Bowerbird at that time, most

records come from Barrie Pennefather who has had a bower in his garden from the mid-1980s. He recorded birds (mostly in 115 but also some in 114) from September to November 1986, April to October 1987, March to November 1988 and April to August 1989, when the Atlas finished collecting data. This is the time that GBS records were only just beginning to become regular (see Table 1) but unfortunately neither the exact number of birds nor the actual dates are generally available. Daniel Smillie also recorded the species in grids 114 and 115 from September to November 1986 and in May 1987, September 1988 and August 1989.

Wayne Gregson recorded the species on Narrabundah Hill in September 1986, McComas Taylor at Mount Stromlo on 19 July 1987 and 21 July 1989, Nora Preston in Duffy on 13 June 1988, and Brendan Lepschi at Mt Stromlo on 16 July 1989. However, the most interesting records are George Guy's from 'Mount Taylor North' in grid J15 (which covers Weston, Waramanga, Lyons, Chifley and Pearce) in November 1988. These predate the first OBS records from Waramanga by over three years and from Pearce by at least five years. John Bissett also recorded the species from Mt Arawang south of Chapman (on the western edge of grid J15) in August 1989 and David McDonald in Kambah (grid J16) in the same month. This predates the first GBS record for this suburb by about eight months.

While there are fewer of them, the records entered into the COG database after the ACT Atlas period generally provide bird numbers and exact sighting dates. They include two birds in Catherine Bennett's garden in Pearce on 3 May 1993, slightly earlier than her GBS records. Harry Saddler recorded one to two birds in his Yarralumla garden (grid Kl4) during August and early November 1994. Bruce Lindenmayer recorded 30 birds at Mt Stromlo (grid 114) on 18 May 1993, which seems to be the highest number recorded together anywhere in the ACT (but see Holland, submitted). He has clarified (personal communication to JH) that the birds were seen during the afternoon on a gravel track leading off from near the summit. This raises the question as to whether he had observed pre-roosting behaviour. Steve Wilson also saw two Satin Bowerbirds in the Mt Stromlo 'area and tracks' on 5 April 1996.

The COG database contains some further records of one to two birds in grids 114 and 115, but also included are sightings from more central suburbs: in K14 by Joan Lipscombe of three birds in Forrest on 5 July 1996 and a single bird in Red Hill on 15 June 1997; and one bird by David Rosalky and James Nicholls in Deakin on 9 and 24 November 1996. Another very interesting record is by Thelma Atkinson of four birds in Farrer (grid K16) on 27 September 1996. These would appear to be the records contained in the 1996-97 ABR (see below), but provide additional details. There are also further records in grid J15: two birds in Weston (John Lepschi) on 20 June 1997, and between one and ten birds round Mt Arawang, Chapman and Fisher (Steve Wilson) between 1 April and 11 June 1999, but these records are well within the known range.

COG Annual Bird Reports (ABR)

The ABR published in *Canberra Bird Notes* reveal no additional ad hoc records, except for 1996-1997 which appears to be the first year where the species significantly further extended its range in line with the increased numbers reflected in Figure 1. The 1996-97 ABR (Canberra Ornithologists Group 1999a) includes suburban non-GBS records from Deakin, Farrer, Forrest, Red Hill and Weston. While they appear to be the same as those on the COG database, the ABR also contains a breeding record from James Nicholls of a bird on the nest in LaTrobe Park in Deakin on 24 November 1996. This is a rare documentation of an actual breeding attempt in the Canberra suburbs, the lack of which was noted in the ACT Atlas (Taylor and Canberra Ornithologists Group 1992). By contrast, the ABR for 1997-98 (Canberra Ornithologists Group 1999b) records no miscellaneous records from the suburbs.

Results from calls for further information

The distribution of the Satin Bowerbird from the above two sources expands on that in the GBS database, and is consistent with feedback one of us (JH) received after a short bird-of-the-month presentation on the Satin Bowerbird at the COG meeting on 12 August 1998. It appears that the species has reached at least the area bounded by Yarralumla/Weston Park, Hughes/Red Hill, Farrer Ridge and Kambah, with bowers common in Weston Creek but also known from Pearce and Kambah. Bower building activity is not included in the GBS because it is not necessarily associated with breeding, though some participants have recorded this as breeding activity.

A request in the September 1998 issue of the COG newsletter *Gang-Gang* for further information on the extent of the spread elicited some records from Jan Druce in Fraser, close to the Mt Rogers reserve (personal communication to JH). She reported seeing a male Satin Bowerbird on three occasions in June 1996, and then between 7 June and 25 August 1997. A male was also recorded from 1 June to the end of August 1998 and regularly came to the house to obtain food such as bread. A female bird was also thought to have been present on one occasion during 1998.

A pair was also said to have been present for at least five years on the north side of Fraser, also close to Mt Rogers (Chris Drury; personal communication to JH) though no detailed records were kept in this instance. These observations raise the question of whether a similar occupation of the northern suburbs by Satin Bowerbirds might occur. It would be surprising if it did so, as Belconnen is not close to the source areas such as the Cotter compared with Weston Creek. Interestingly, and in contrast to other areas (see below), there were no Belconnen sightings in 1999.

Richard Mason (personal communication to JH) recorded the first Satin Bowerbird in his garden in Griffith on 22 February 1996; a green bird was sighted for a couple of days.

Winter 1999 records

From the reports on the COG telephone hotline, the 1999 winter saw records of

Satin Bowerbirds from new locations, including extensions into new suburbs or gardens. Most interesting of these was a report by Graham Clifton on the 21 May 1999 edition of the hotline of Satin Bowerbirds in Queanbeyan, where he had never seen them before. About a month earlier Lorraine Lawrence reported that Satin Bowerbirds had returned and re-commenced building a bower used in previous years near her workplace in Holder. Shortly after a work colleague of JH reported that his neighbour was aware of a bower, possibly the same one, built near the Holder shops. This work colleague also reported a new bower in another neighbour's garden about 150 metres from these shops, shortly thereafter.

Following the publication of the earlier article (Holland 1999), a further call for information was made in the August 1999 edition of *Gang-Gang*. Dianne Deans provided some records from her garden in Kambah; starting with a single green bird on five occasions and including additional summer records for this suburb in December 1997, January and December 1998. Numbers apparently increased in August 1999 with at least five green birds together and for the first time a male with a bower in Crozier Circuit. Julie McGuiness also had sightings in her Kambah garden for the first time during winter 1999: two green birds in mid May and one in mid June. Stuart Harris reported two green birds close by, early in August 1999. All of these records come from the western side of Drakeford Drive.

David Saywell noted that a green bird had been a regular visitor to his backyard in Torrens (a new suburb for records) over spring/summer 1998-99, using water and occasionally visiting the bird feeding tray. The bird seemed to follow a regular flight path, heading due south in the mornings and north in the afternoons and was joined by a second, possibly young, bird towards the end of the season. He also reported a single green bird in his garden on 21 August 1999, and noted that he had regularly spotted a similar bird in Pearce over the past couple of years.

Keryn Kefous reported seeing six green birds together while she was horse riding at Mt Stromlo mid-afternoon on 25 August 1999, and noted that she had often seen single birds there in the past. Helen Fallow reported that she had seen a green bird for the first time in her garden in Stirling during June to August 1999 and noted she was familiar with their presence as well as bower building activity in both Chapman and Duffy. Her photograph of a bowerbird in Maurice Sexton's garden in the September 1999 edition of *Gang-gang* clearly shows an immature male, recognisable by the light bill colour. Maurice also reported that this bower had been destroyed for about two weeks during July 1999, but had been rebuilt since then with consequent great activity involving one male and up to six green birds.

Conclusion

The above chronicles in some detail the increase in abundance and extension of the range of the Satin Bowerbird through its gradual movement east into the Canberra suburbs. Table 2 provides a summary of the first occurrence of the Satin Bowerbird in each suburb, the first summer record and the highest number seen.

Table 2 First Satin Bowerbird records in Canberra suburbs

Suburb/location	*First `winter'* record (No. of birds)*	*First summer record (No. of birds)*	*Highest number of birds recorded (Month/Year)*
Botanic Gardens	Nov 77 (1)		1 (Nov 77)
Rivett	Aug 80 (4+)		See Holland 2000
Yarralumla	Autumn (?) 82 (1)*	Jan 91 (1)	5 (Jul 97, Jun 98)
Duffy	Aug 82 (2)	Feb 91 (1)	12 (Jun 89/Sep 93)
Chapman	May 85 (8)	Jan 90 (6)	15 (Jun 93); (see Holland 2000)
Deakin	June 85 (1)		1 (Jun 85, Oct 97)
Holder	Sep 86 (1)	Jan 95 (1)	7 (Jun 95)
Ainslie	Aug 87 (1)		1 (Aug 87)
`Mt Taylor Nth'	Nov 88 (1?)		1 (Nov 88)
Kambah	Aug 89 (1?)	Dec 96 (1)	6 (Aug 99)
Fisher	Mar 90 (1)	Feb 91 (1)	17 (July 93)
Waramanga	May 91 (l)		6 (May 99)
Pearce	May 93 (2)	Dec 93 (l)	5 (Aug 93)
Griffiths		Feb 96 (1)	1 (Feb 96)
Fraser	June 96 (1)		2 (winter 98)
Red Hill	June 97 (1)		1 (Jun 96)
Forrest	July 96 (3)		3 (July 96)
Farrer	Sep 96 (4)		4 (Sep 96)
Weston	June 97 (2)	Feb 96 (1)	10 (Jun 98)
Hughes	Mar 97 (l)		1 (Jun 97)
Stirling	May 97 (l)		1 (May 97, Jun/Aug 99)
Torrens	Spring 98 (2)	Summer 98 (2)	2 (2$^{o^{\circ}}$ half 98)
Queanbeyan	May 99 (1+)		1+ (May 99)
Gleneagles	May 00 (2)		2 (May 00)

* Defined as beginning of March to end November
** Recorded as having been present at Yarralumla Nursery prior to 1976

The inevitable question is why this has occurred and what the birds are doing in gardens. As noted in *Birds in Canberra Gardens* (COG 2000) a primary objective seems to be food but it seems clear that it is also increasingly for bower building activities (see Holland 1999 and Holland, submitted).

This article is the first to illustrate what can be done with the information available from the COG databases and other sources. Even for this species further studies could be carried out. Even though further insights into recent bower building activity and behaviour around bowers in the Chapman area are contained in a separate paper (Holland,

submitted), many questions remain that are well beyond the scope of this paper.

Acknowledgments

The authors would like to thank all those, many identified above by name, who provided the information which has allowed the preparation of this paper, in particular those who gathered the records through participation in the GBS. Special thanks are due to David Purchase who first suggested this paper.

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FURTHER OBSERVATIONS OF NESTING BY CRESTED PIGEONS ON THE BORDER OF CHAPMAN AND RIVETT

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In a previous article (Holland 1998) I described successive nesting attempts by a pair of Crested Pigeons *Ocyphaps lophotes* near my house in Chapman during the 1997-98 breeding season. In this article I describe observations of further attempts by this species to breed nearby over the following two seasons, culminating in fledged young in February 2000 and again in June 2000. These breeding events occurred very late in the season and in a time of relatively good rainfall when Crested Pigeons were relatively scarce compared to the high numbers present during earlier drought conditions.

Renewed activity at former nest in Chapman - winter 1998

Crested Pigeons were fairly common in the area of Chapman and Rivett in May 1998, despite the easing of the drought in mid April: seven were seen on Rivett Oval, and at least 15 were present at the Weston Creek Tennis Courts on 3 May. Numbers in our garden area, however, were rather low until towards the end of May, when up to four were generally present, including on the roof of our house on 24 May. Three birds were particularly conspicuous in our garden on 8 June, two of which spent 30 minutes late in the morning displaying and mutually preening on a neighbour's fence. Sightings of two to three birds, as well as up to eight nearby, were made regularly throughout June.

On Saturday lI July 1998, repeated calling round 7.30 h was traced to the hakea bush in which the species had nested previously (Holland 1998). One bird was seen on the old nest and another on the wires less than 50 m away. Over a period of about 20 minutes around 9:00 h, one of these birds was observed taking nesting material to its mate on the nest, after which they were not seen for the rest of the day. Two birds seen regularly in this area the next day and the following Saturday did not appear to approach the nest. However, at 8.45 h on Sunday 19 July, a bird found sitting on the nest was briefly joined by a second before both flew away. The nest was again occupied at 10.45 h but no further sightings were made that day.

Little activity was observed over the following weeks, but late on 26 July a pair of Crested Pigeons flew down and settled in the large wattle at the bottom of our garden; they were still there at 6:55 h the next morning. I had suspected they had roosted there a number of times before. At 8:40 h on 1 August two birds were discovered in the hakea hush, within 30 cm of the nest, where they stayed for a short period before flying away. A bird was again on the nest at 9:15 11 and 9:55 h.

I was then away from Canberra until late on 10 August, and there was no sign of birds near the nest on 12 August. However, two birds were observed displaying/calling there at 7:45 h on

Saturday 15 August, before flying away and returning for about 10 minutes at 9:00 h. A bird was also calling at the nest at 4:15 h. The next day, two birds were present at 7:45 h, and around 11:00 11 one bird was seen gathering nesting material and taking it to the other in the hakea bush. Soon after there were at least 5 birds in the area, apparently disputing with much flying around. A bird was seen on the nest at 15:15 h that day, however little activity was observed over the next few days.

To my surprise, the nest seemed less substantial on Saturday 22 August, and even less so the next day. By 28 August hardly a stick remained. Over this period only a single bird was seen, well away from the nest. Observations of one to three birds continued over the next week: one bird calling from wires before joining its mate in the hakea bush at 6:50 h on 3 September, three birds displaying during the morning of 4 September, and two on the roof of our house on 5 September. No birds were recorded over the weekend 12-13 September.

Reduced activity

Sightings (and aural observations) of one to two birds continued from September to November 1998, with a maximum of six birds on 15 October. No further courting activity was observed during this period, except for several instances of birds doing what I have termed 'stalls' - flying up nearly vertically and then descending steeply, as described by Frith (1982). On 17 November, after hearing them calling to each other, two birds were observed displaying on wires before one flew away.

Sightings over the summer of 1998-99 were few, with occasional records of three or four birds. Activity increased from the beginning of March 1999, particularly around a clump of conifers at 58 Darwinia Terrace, Chapman; despite careful searching no nest was found. Sightings were scarce in April, picked up somewhat during May (but never more than two birds), and none at **all** was made in our garden area during June. Crested Pigeons seemed scarce in the Weston Creek area generally throughout July.

Nesting attempts in Rivett - spring 1999

Activity increased briefly in August. On 1 August a bird was seen taking nesting material into some tea-tree *Melaleuca amillaris* bushes just outside of my Garden Bird Survey area, but **I** could find no sign of a nest. After seeing a bird fly into these tea-trees again on 15 August, a quick search revealed the bird on a typically flimsy platform nest about 4 m high. These bushes, about 5 m high, extend for about 30 m and are set about 5 m back from a public pathway. The bird was seen again on the nest that afternoon, but not on 21 August and, while two birds were on the wires close by at 7:30 h the next morning, the nest could no longer be located.

For the remainder of 1999 activity was low. Only once (10 September) was a bird again seen near this nest site, only single birds were recorded in my Garden Bird Survey area, and displaying was observed only once (29 August) although 'stalling' was observed on a number of occasions until early October. Few birds were recorded in November and none at all during December.

Successful nesting - summer 2000

After the Christmas/New Year break, Crested Pigeons appeared to be more prominent, and at 7:30 h on 22 January one was seen to fly up from the path into the tea-tree bushes while three remained on the ground, two of which displayed briefly. A quick search revealed the first bird sitting on a new nest, where it was again seen on several subsequent checks during the day. The nest was about 4.5 m high and less than 2 m from the previous site, and though fairly obscured, it did appear more substantial than the previous nests. Regular checking until 12 February always found this bird on the nest, though it appeared to be gradually sitting higher and higher, indicative of brooding. On the afternoon of 12 February a young bird was seen sitting next to the nest, which its parent still occupied. The following afternoon, two young birds occupied the nest with an adult bird, presumably the parent, feeding on the ground about 50 m away. A young bird was still on the nest late on 15 February (with an adult seen preening on the wires 60 m away), but the nest was empty on both 17 and 18 February.

At 7:30 h on 19 February a Crested Pigeon was again seen on the path about 50 m past the nest. The bird then flew up into a nearby tree where it was harassed by several Pied Currawongs *Streptera graculina.* It appeared to be an adult bird and **I** suspected the currawongs were hoping it would lead them to its young. The following morning two birds were seen feeding on the ground about 20 im from the nest. They were apparently an adult and a juvenile, the latter being the same size and colour as the adult, except for some whitish patches in the wing, and it followed the other bird very closely.

During this nesting period no other Crested Pigeons were seen within 150 m of the nest. However, three birds were seen together on wires on Darwinia Terrace, and another on wires immediately above the nest, on the morning of Saturday 4 March. Crested Pigeon numbers seemed to increase in the Weston Creek area generally around this time, as they were seen regularly on wires, though usually only in groups of up to three. A group of 15 at the Rivett shops/oval on the morning of 26 March was exceptional, and overall numbers were much lower than those during the 1997-98 drought (see Holland 1998).

Successful nesting May — June 2000

With no Crested Pigeon sightings in my GBS area or the nest area during March, **I** assumed the birds had moved away, but on the morning of Sunday 9 April **I** saw one bird feeding on the ground within 20 m of the nest, and another 50 m away. Another was seen shortly after on wires within my GBS site. At 8:30 h on Saturday 15 April three birds were calling in a gum tree about 20 im from the nest and were later seen on the ground nearby. Interestingly, a Spotted Turtledove *Streptopelia chinensis* appeared to be associating with the Crested Pigeons, as it was again the next morning when up to five birds were seen in trees, on the ground or on wires in close proximity to the nest.

Calls heard from the tea-tree bushes on the morning of Friday 21 April led me to a single bird apparently searching for nesting materials about 10 m from the old

nest. Calls were again heard the following morning, and on 25 April a bird was seen to fly up to this spot with nesting material. Though up to five birds were seen in the area over the Easter/Anzac Day break, there were no further observations of breeding activity.

At 8:30 h on Saturday 29 April a bird flew from near the nest site to the ground and then back again with nesting material. Inspection showed that it settled next to another bird already on the nest, but when it flew down to the ground again it was harassed by Australian Magpies *Gymnorhina tibicen*. The next morning a bird flew down from the wires and joined another on the nest, which was unoccupied on a number of subsequent checks. Birds remained in the area for the rest of the afternoon, with a maximum of seven seen feeding together within 50 m of the nest.

On 1 May, and again on the weekends of 5-6 and 13-14 May, regular checks revealed a bird always present on the nest. The only other Crested Pigeons seen nearby over this period was one sitting quietly on the wires about 40 m away on the afternoon of Saturday 5 May, and one that passed through our garden on two occasions on the morning of Sunday 6 May. These observations reinforced my feeling from earlier in the year that other birds appear to move away from the nesting area during the incubation/brooding period.

By 28 May, with very cold snowy conditions, the only real change was that the sitting bird was much higher on the nest, indicative of brooding. The situation was similar on 3 June, except that a second bird was seen in the afternoon sitting on the wires less than 20 m from the nest. A few minutes later there were two adults on/near the nest, one of which flew more than 100 m away after about 30 seconds, suggesting a change of bird on the nest. Later in the day one of the birds was heard calling softly, and the next day one of them was seen on the wires about 75 metres away.

When I checked the nest just after 7:00 h on Saturday 10 June, two large and one very small bird, which I initially thought to be three fledglings, were perched about a metre from the nest, the smallest nestled up very close to one of the others. Less than an hour later, however, only the small one remained, while three adult birds flew up to wires about 40 m away and another three sat on wires about 75 m away. At 12:30 h an adult was on the nest, apparently brooding, but otherwise the chick was alone near the nest for most of the afternoon. At the 16:30 11 check the chick had moved onto the nest and sat together with an adult bird apparently preparing to roost.

I was away the following morning but the chick was again near the nest in the afternoon and appeared to be settling back on the nest with a parent at 16.30 h. However, a late check at 17:00 h revealed two adult birds with the chick snuggled between them about a metre from the nest. At 7:15 h the next morning one bird had moved slightly away and the three birds were in almost identical positions as two mornings earlier. Until mid-afternoon the chick again remained near the nest (with on one occasion an adult bird feeding about 30 m away) but a later check failed to locate any bird.

Early morning checks during the week indicated the adults were still sitting. On the morning of Saturday June 17, just after 7:00 h, both adult birds were present in the bushes, close to where they had perched with the chick. They remained there until about 8:00 h but were not seen for the rest of the day, nor the following morning. The only sighting for 18 June was of two adults on the wires about 30 m away just before 8:0011. They appeared rather flighty and I had the impression they wanted to fly down to the nest site, or perhaps to the fledgling in the bushes nearby.

No birds were seen near the nest area the following weekend and I concluded that the birds had moved away; it is unclear whether the juvenile survived. I was nevertheless impressed that the juvenile survived the cold, snowy and frosty conditions of the last days of May and early June. The large number of Pied Currawongs in the area would also have been a threat to the chick's survival, but at least the chick's silence (I never heard it call) would have helped in this respect.

No further birds were seen until 9 July when one was observed taking nesting material to its partner at a new site 5 m from the old nest. This also occurred the following weekend and for most of the morning of 22 July the bird was on the new nest with its mate nearby.

Conclusion

These observations provide further evidence of the nesting abilities of this species in suburban Canberra. Breeding may be expected to be widespread and similar observations could likely be made in many other Canberra suburbs. There seems little doubt that the Crested Pigeon's ability to breed throughout the year is a major factor in its phenomenal increase in numbers and spread throughout the ACT over the past ten years or so.

References

Frith, H.J. (1982). *Pigeons and Doves of Australia.* **Rigby:** Adelaide.

Holland, J. (1998). Observations of successive nesting attempts by Crested Pigeons in a Chapman garden. *Canberra Bird Notes* 23: 17-19.

As noted previously Jack Holland is a longstanding member of COG who continues to keep detailed records of birds in his garden for the Garden Bird Survey, and has done so since the inception of this scheme in 1981.

ODD OBS

'Odd' behaviour of Common Myna

About 25m from our dining room window in Stirling, ACT, a Blakely's Red Gum *Eucalyptus Blakelyi* grows in parkland grass. Almost 4m up, on the north-east side is a spout marked by protruding Sulphur-crested Cockatoo feathers in which Common Mynas *Acridotheres tristis* nested last year (1999). The young fledged on Christmas Day and dispersed, or so I thought.

From mid-January 2000 onwards a single bird was seen entering the spout occasionally. We were away during the first week of February, but on the 7th two birds were on frequent feeding trips to the nest hole; I timed four in ten minutes. This continued until on February 20th, at 9:30 am, I climbed a ladder, held onto the rim of the spout and peered in. At least two feathered nestlings cowered just inside a coronet of cockatoo quills while a parent bird scolded me nearby, returning to the nest as soon as I shouldered the ladder. It was a hot day, 32°C, and no shade fell on the nest until later.

As I sat down to lunch at about 12:30 pm I noticed two adult mynas fluttering and pecking at something in the grass midway between our house and the nest tree. Was it a food source? I found a newly dead nestling there, similar to those I had seen in the nest. An adult resumed its pecking as soon as I returned to the house. Then it flew up and perched in the tree, but not by the nest, while the other adult pecked at the corpse, tossed it about and danced around fluttering before perching by the house.

Sometimes both birds at once, but mostly by turns, they continued for over 20 minutes. Then one bird flew off with the remains, while the other patrolled the grass and returned to the nest. Normal feeding resumed up to six trips in ten minutes.

Had the nestling died of fright, or hypothermia, or siblicide, or just fallen from the nest? The parents certainly made sure their chick was dead! The remaining brood fledged on February 27th.

Delia Johnson

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Bird 'Armada' Responds to Brown Goshawk Attack

Around 7.30 am on Saturday 23 June 2000, I heard a cacophony of bird alarm calls in the back garden of my Weston house. On venturing outside on a cold, grey morning, I saw at least 30 birds on the power lines and in the nearby *Eucalyptus nicholii:* Australian Ravens *Corvus coronoides,* Pied Currawongs *Strepera graculina,* the resident Australian Magpies *Gymnorhina tibicen,* several Magpie-larks *Grallina cyanoleuca,* Red Wattlebirds *Anthochaera carunculata* and a few Common Mynas *Acridotheres tristis,* all very agitated. I noticed a few Magpie-lark feathers on the ground and at first thought the culprit might be a cat.

The noise and agitated behaviour went on for several minutes. The birds were not attacking anything and I was confused as I could not see a cause. Then a raptor rose suddenly from the ground where it had been hiding behind a shrub, with a black and white body in its talons. It was an immature Brown Goshawk *Accipiter fasciatus,* which flew to another eucalypt 50 m away, followed by the bird 'armada' which hung around it for some time then gradually dispersed. I see Brown Goshawks around my garden from time to time and occasionally a Collared Sparrowhawk *Accipiter cirrhocephalus*. I once observed an immature Brown Goshawk take a Common Myna on a neighbour's nature strip (reported in *Canberra Bird Notes* 21(1) March 1996, page 13). I was sorry it was not a myna also on this occasion.

Jenny Bounds
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Swan behaviour at Kelly's Swamp

In November 1999, I observed the Black Swans *Cygnus atratus* at Kelly's Swamp, with their cygnets in tow and wished them a better fate than their predecessor's; a fate I shall describe in this odd observation.

About five months beforehand, in June 1999, I witnessed a titanic battle between the males of two pairs of swans. It began with the normal pushing of each other along an imaginary line on the pond. After ten minutes of this one of them, A, broke off and turned away. The instant this was done, the victor, B, grabbed the other on the back by the feathers. A then tried to fly away only to find B being towed behind, still holding onto the back feathers. Hampered by the extra weight A soon tired. B pulled himself on top of A, holding A's body completely underwater and kneading it with his feet, keeping A off balance. The only visible part of A was his head and neck, lying parallel with the water surface, with B constantly pecking and worrying it on the neck. A looked totally exhausted after five minutes of this, and seemed doomed, but then gave a huge heave, dislodging B from his back and clambered up an island, which was providently close by. B quickly followed up the bank and again climbed on top of A and began rocking A with his feet and attacking his neck. After another three minutes of this A eventually struggled free and took off, like the proverbial 'bat out of hell'. **I** honestly feel A would have been drowned if the island hadn't been close by and the water shallow.

The victor and his mate went on to breed, having five cygnets about five weeks later and settling down to a peaceful life. **I** observed them for approximately three weeks, until one Sunday I noted there was only one adult and two young. Believing the others were probably feeding in the reeds, I thought nothing of the absence. On the Monday I checked and there was still only one adult and two young. Driving past Kelly's on Tuesday **I** noticed two adults, so I pulled over to have a closer look. There were in fact four adults on the pond, one isolated at the southern end and one at the northern end, with the dominant pair controlling the greater pond in the centre. I began looking for the young, but without success. When I was walking back to the hide, one cygnet appeared from the undergrowth from an

island and began paddling towards Long Island. The dominant male in the centre spotted the cygnet from 100 m and began flying over. It circled and landed close to the cygnet, which paddled towards its assassin. The adult grabbed the cygnet by the neck and began worrying it as a dog does a rat. None of the other adults showed any response, although one of them would have had to have been the parent. After some minutes of this savaging when the cygnet showed no signs of life, the male then turned and gave two victory beats of its wings and swam towards its mate whistling. They greeted each other, leaving the body of the cygnet floating in the water.

So when you look into a swan's red eye, is it red rage you see there? Just when you thought it was safe to go swimming!

Bob Rusk

24 McIntosh Street, Queanbeyan

RARITIES PANEL NEWS

A short list of endorsed reports on this occasion, including a few older records. The Panel is still considering a number of other records and in particular is seeking further information from some reporters. It takes this opportunity to exhort persons completing an unusual bird report form to pay particular attention to the description of the bird seen. So many reports which reach the Panel even neglect to mention such basic information as the approximate size of the bird. The more detail that can be supplied, preferably immediately after the sighting, the better are the chances of the Panel to reach the right conclusion.

RARITIES PANEL ENDORSED LIST NO. 50 (June 2000)

Intermediate Egret *Ardea intermedia*

1; 21 Nov 99; J McGuiness; Kelly's Swamp
l; 12 Dec 99; P Wyllie; Kelly's Swamp

Black Kite *Milvus migrans*

1; 28 Dec 98; H Perkins; Kambah

White-headed Pigeon *Columba leucomela*

1; 22 Mar 00; J Wilson; Kingston.

Spotted Turtle-Dove *Streptopelia chinensis*

1; 20 Feb 00; M Lukacs, B Rusk and P Veerman; Kelly's Swamp

Diamond Dove *Geopelia cuneata*

1; 4 Mar 00; S Harris; Billy Grace Reserve, Wee Jasper

Common Koel *Eudynamys scolopacea*

1; 18, 25 Nov 98, 2 Dec 98; B Wilson; Allchin Circuit, Kambah
1; 13, 14 Dec 99; C Bennett, Parkhill Street, Pearce

Pied Butcherbird *Cracticus nigrogularis*

1; 25 Mar 00; J Bounds; Mulligan's Flat Nature Reserve
1; 10 Apr 00; J Nicholls; 5 km north of Sutton

COLUMNISTS' CORNER

The views expressed by our columnists are personal views and do not necessarily represent the views of COG.

Out and about

The publication of *Birds of Canberra Gardens* is a good news story for the COG committee members who initiated the garden bird study 17 years ago and for all members who have regularly filled in sheets since, especially those few who have submitted sheets every year from the very beginning. This type of regular bird watching is vital if we are to record the base data from which changes in the avifauna can be identified and investigated. Bird studies by academics tend to be limited to the period it takes to get a Masters or a PhD, whilst those undertaken by CSIRO tend to be limited to problem species as they attract funding from governments or equivalent bodies. It is only amateurs and organisations of amateurs that can provide both the free time and the long term perseverance to gather information over a long period. Once again congratulations to the original designers of the survey and to the regular contributors - please keep going. To those who do not contribute - please consider!!

On a national scale I find it sobering to think that the commencement of the first Atlas of Australian Birds by the RAOU was in 1977 - 23 years ago. I must be getting old. Looking back and comparing the number of contributors for that Atlas and the number for the present Atlas shows how many more people are now aware of and actively interested in birds. In 1977 the thought of using amateurs to gather information about distribution was rather novel. Now that approach is recognised as a standard technique and is used on a regular basis - COG having used it for the local Atlas as well as various local surveys . It shows that bird watchers have an important role to play in ornithology if they are prepared to work as part of a team and donate some time on a regular basis.

Whilst in a 'comparing now with then' mode I have noticed conservation over the last five to ten years is becoming more privatised. By that I mean more and more private organisations are buying and managing land for conservation. The role of preserving habitat is not being left solely to government agencies any more but the individual now has an opportunity to contribute directly to habitat conservation. Examples of national private organisations that have purchased land for conservation are the Australian Bush Heritage Fund (ABHF), Birds Australia and Earth Sanctuaries Limited. Each of these targets slightly different outcomes in the conservation of biodiversity - the ABHF targets discrete `land of outstanding ecological significance', Birds Australia habitat that supports endangered species or can provide an educational experience and Earth Sanctuaries land that can be fenced to protect mammals from predators and also provide an educational experience. Each of the organisations actively manage their properties to ensure their aims are met. This trend is being

recognised by the government in its review of the taxation system and part of the amendments allow income tax deductions for property donated to private organisations and capital gains tax exemption for property left to private organisations in wills.

People and Nature Conservation - Perspectives on Private Land Use and Endangered Species Recovery is the title of the 1995 Transactions of the Royal Zoological Society of New South Wales which contains a number of interesting papers on the topics defined in the title. One paper by D.G. Barratt with local and bird content covered the preliminary findings on predation and movement by house-based domestic cats in a suburban Canberra environment. The author (as all researchers do) quite reasonably proposes that more research is needed into the topic. She writes that the numbers of prey that cats take are not evidence that cats are detrimental to entire taxonomic classes of animals on a national or even regional scale. She argues future research needs to assess how common the prey is in that environment not just the numbers caught and writes it is feasible to consider mature suburban parks and gardens as artificial resource-abundant environments within which domestic cat predation merely culls seasonal excesses. She goes on to quote a New Zealand study in the Orongorongo Valley where the researchers argued that cats may suppress populations of other more damaging predators such as rats and thus allow denser populations of birds than would exist without them. However she does also say that hunting by domestic cats beyond the suburban edge or on relatively undisturbed blocks may pose a more serious threat to wildlife populations.

I have written before about the way lead shot has been banned in some countries for killing waterfowl because of the way the shot falls to the bottom of the lake and causes lead poisoning in dabbling waterfowl. Apparently lead shot is not the only culprit. Lead sinkers and weights used by anglers also cause lead poisoning and death in waterfowl. I have just seen a publication produced by the Canadian Wildlife Service in which it states one lead weight is enough to kill a bird and that half the Common Loons found dead in Canada each year have died from eating a lead sinker. An estimated 500 tonnes of lead weights are lost in Canadian waters each year. The use of lead was banned in Britain in 1987, the US is planning a similar ban and lead is banned in Canada's National Parks and Wildlife Areas. Does anybody know if lead weights are banned in Australia?

The March 2000 newsletter of the Birds Australia Southern NSW and ACT Group contains quite a bit on Birds Australia's conservation efforts in NSW including an article on the NSW Woodlands Bird Project and an article on proposed guidelines for handling conservation issues. It also has an article on a 'wonderful weekend at Barren Grounds'. Barren Grounds is a Birds Australia observatory at which people can get to learn about birds. The article contained the following:

But the piece de resistance occurred as we sat on top of the Bong Bong Mountain having lunch. A pair of Peregrine Falcons had young in a nest just a little further

> along the cliff. We couldn't see them but we could hear them. One of the adults became very agitated at our proximity and began to circle and wheel around us, calling repetitively and not settling until we retreated back into the heathland and left them to their solitary cliff.

This raises to me the classic question of how much can we interfere with birds whilst educating people about them. Is the disturbance of nesting peregrines a `piece de resistance' or an unfortunate accident? Is it justifiable to show people nesting peregrines in order to increase their interest in birds? Maybe some of the people **will** leave enough money to Birds Australia to buy the cliff and preserve the peregrines in perpetuity. An interesting philosophical question. Is this sort of interference not as bad as, or worse than, duck hunting?

G. tibicen

Thoughts on birds and habitats

What a fascinating theme of Australian ornithology is the aligning, with ever-greater precision, of birds with specific habitats. Although your columnist's distinct impression is that this field of inquiry is getting a lot more scientific and broad-based, interest in it is far from a recent development.

John Gould (in Australia 1838-1840) was really keen for information about where birds lived. In his 1865 *Handbook to the Birds of Australia* he never failed to include whatever habitat information was available to him, sometimes from his own observations, sometimes transcribing the notes on the subject of John Gilbert, his collector (in Australia 1838-1841 and 1842-1845). A random selection of examples:

> it is usually met with in pairs hopping and creeping about among the underwood or very thickly-foliaged trees, but may be more frequently seen in thickets situated in the midst of swamps or among the mangroves. (Grey Whistler)

> They prefer the most remote parts of the forest, particularly the bottoms of deep gullies, the seclusion of which is seldom disturbed by the presence of man, and where animal life is almost confined to aphides and other minute insects. There are times, however, especially in winter, when they leave these quiet retreats, and even enter the gardens of the settlers; but this is of rare occurrence. (Pink Robin and Rose Robin)

> it appeared to give a decided preference to the beds of dry rivulets, and to thinly timbered plains, the dense brushes near the coast never being visited by it; it would seem therefore to be a species peculiar to the interior of the country (Red-capped Robin)

> The locality it frequents consists of mountain ridges not very densely covered with brush ... (Albert's Lyrebird)

> lnhabits thickets of a small species of *Leptospermum* growing among the sand-hills which run parallel with and adjacent to the beach. (Western Whipbird)

> it appeared to give preference to a loose sandy soil studded with high rank grass, which, growing in tufts, left the interspaces quite bare; through the natural labyrinth thus formed the Striated Wren ran with amazing rapidity ... (Striated Grasswren)

> I met with it in tolerable abundance in the neighbourhood of the Lower Namoi,

> where it appeared to give a decided preference to those parts of the plains which were of a loose mouldy character, and with which the colour of its back so closely assimilates as to be scarcely distinguishable from it. (Blue Bonnet)
>
> it evidently gives a decided preference to open grassy valleys and the naked crowns of hills, rather than to the wide and almost boundless plain (Red-rumped Parrot)
>
> These small and uninhabited islands are covered with grasses and scrub, intermingled with a species of Barilla nearly allied to *Atriplex halimus;* and almost the only land bird that enlivens these solitary spots, is the present beautiful parakeet: I frequently flushed small flocks from among the grass, when they almost immediately alighted on the Barilla bushes ... (Orange-bellied Parrot ─ on Bass Strait Islands)

Overall, there's probably more detail on habitats in the *Handbook* than in your average field guide.

Maybe it's a matter of age, but it seems strange to me to think that less time elapsed from the publication of Gould's *Handbook* to the first appearance of Cayley's *What Bird Is That?* (in 1931) than from the latter event to the present time.

When Neville Cayley produced Australia's first modern field guide he was certainly habitat-conscious. He chose to present all species by broad habitat categories. Although this was the most useful available guide for many years, his approach had some disadvantages from an Australia-wide viewpoint. Three plates were devoted to `Birds of the Brushes and Big Scrubs'. The introduction explained that this particular description referred to 'dense vegetation of the rain-forest type', which was 'known as "scrub" in Queensland and "brush" or "big scrub" in New South Wales'. 'Scrub' has no such association for some other Australians, for Victorians, for example, and indeed `scrub' in bird names has no single habitat connotation: contrast the relevant `scrub' in scrubfowl, scrub-bird, scrub-robin, and scrubtit.

In Cayley's book two lots of pigeons and doves were separated by nine other plates, and the kingfishers were in four different places. I recall personal puzzlement in my primary school days that the Golden Whistler, for me a bird of local parks and gardens, was not the same-looking bird shown as occurring in `open forest' (this being the Mangrove Golden Whistler from tropical Australia) but rather the bird designated as belonging to the mysterious 'Brushes and Big Scrubs' shown on another plate in company with quite unfamiliar birds.

For a comprehensive popular book, an exclusively habitat-based presentation of species is unsatisfactory. A better approach is that of Michael Morcombe in *The Great Australian Birdfinder*. A `habitats' section shows a selection of widely-distributed birds associated with particular habitats, while a second, larger section addresses the remainder according to regional distribution.

While birds *exclusively* occurring in a particular habitat can be determined, there may not be much point in a popular reference book in distinguishing them

from other species that not exclusively but *regularly* occur in that habitat. According to Dick Schodde, in *The Mallee Lands: A Conservation Perspective (1989),* the Australian Mediterranean mallee has 150 bird species regularly occurring therein — but only 12 species endemic to that 'biome', and only 30 species are endemic to subtropical rainforest areas.

*

It seems that traditional broad classifications like 'rainforest' and 'open forest' may not be as significant as some sub-classifications. E S Hoskin's little book on the distribution of Sydney's birds *(The Birds of Sydney* (1991)) uses seven main habitat designations: rainforest, heathlands, urban/suburban etc. However, there is superimposed a sub-classification which assigns the whole of the County of Cumberland to either 'Shale' or 'Sandstone' areas on the basis of geological formation. Evidently with birds, as with wine-growing, the character of the earth below has a strong influence on what is produced above it. Sandstone areas include *Eucalyptus* and *Angophora* forests and heathlands; Shale areas include *Eucalyptus, Melaleuca* and *Casuarina* forests. The distinction, it seems, has decisive implications for bird distribution. For example:

Peaceful Dove: once common in Shale areas...not often recorded in Sandstone areas

Black-eared Cuckoo: restricted to the Shale areas

Channel-billed Cuckoo: more common in the Sandstone than in the Shale

Dollarbird: most records from the Sandstone

Little Cuckoo-Shrike: largely in the Shale, Sandstone/Shale overlaps, or Shale-caps in the Sandstone Red-capped Robin: in earlier years, comparatively common in the Shale country in the west

Hooded Robin: formerly more abundant in the Shale areas to which it is largely restricted

Jacky Winter: moderately common in some areas of the Shale

Spotted Quail-Thrush: confined to the Sandstone

Southern Emu-Wren: inhabits damp heaths, peat bogs, saline marsh or water tables, all in Sandstone areas

Rock Warbler: breeding resident of the Sandstone areas

White-browed Scrubwren: throughout the Sandstone ... occasionally in the Shale

Chestnut-rumped Heathwren: confined to the Sandstone and the Shale convergence in some areas

Speckled Warbler: breeding resident of the Shale areas

Weebill: bird of the Shale areas, but sometimes found in the Sandstone /Shale convergence

Brown Thornbill: Sandstone areas, rarer in the Shale

Southern Whiteface: formerly a common species in the Shale areas Yellow-tufted Honeyeater: Sandstone Fuscous Honeyeater: Shale Black-chinned Honeyeater: Shale White-naped Honeyeater: prefers Sandstone

Painted Honeyeater: Shale areas where mistletoes grow plentifully

New Holland Honeyeater: Sandstone

Ern Hoskin offers these generalisations on the Shale birds:

> The undulating Shale country, in its general appearance bears a strong resemblance to the more inland and drier parts of New South Wales. It is interesting to note therefore that the characteristic Shale birds ... are species which may be considered to be, in New South Wales, predominantly inland or western forms ....
>
> The Shale birds, except the Weebill, are now all but extinct in the County. They are seen only in a few areas in small numbers where once they were relatively common.

After those digressions, I return to note the current high level of effort to learn more about habitat preferences. To us COG non-professionals, some sense of the front-line action here was conveyed by two luminous presentations at recent meetings. One was by Henry Nix on habitat preferences of the myiagrid flycatchers, outlining the evidence for his view that shade cover was the probable differentiator. The other was by David Lindenmayer who gave a summary of his major survey of species distribution in *Pinus radiata* plantings in the Tumut area, including in strips of native vegetation within the plantings. David's findings promise to break new ground in understanding the impact on birds of such habitat changes, and have the backing, clearly enough, of the most rigorous methodology (as well as the help of COG members of course).

Meanwhile, rank-and-file bird observers are being urged to submit pro forma habitat information with their reports for the current atlassing projects being conducted by COG and Birds Australia. Clearly enough this provides a useful link between bird watching and conservation. Also operating in this field is the group known as New South Wales Bird Atlassers Inc (NSWBA), which has its own ambitious plan to align birds and habitats, indeed proclaiming its belief that 'no other organisation has previously attempted to define bird distributions and link the distribution of each bird species with its preferred habitats in such detail over such an extensive area'.

To that end, NSWBA has recently published its *Guide to Bird Habitats in New South Wales*, a 155-page booklet (on sale at COG meetings). The first point to note is that the NSWBA area of coverage encompasses the ACT, so our habitats are included in their habitats, so to speak. Seventy-eight habitat types are described, with the aid of 216 photographs. Further sub-division by the reporter is invited where dominant plant species can be particularised. Many habitats are clearly inapplicable to the ACT, for example 'Ocean Waters, off Continental Shelf, 'Mangrove' and `Gibber'.

As a location is given for each photo, one might naturally, if parochially, have a look for any that might have been taken in the fairly extensive COG area-of-interest. Unfortunately, the only one expressly - but erroneously - attributed to the ACT itself is a heathy scene in Jervis Bay Territory National Park. Three other pictures, respectively of 'Heath', `Mountain Mal lee', and 'Other Grassland', are taken in Kosciuszko

National Park, the latter at Long Plain. The picture taken closest to Canberra is of 'Dry Sclerophyll (Smooth-barked) Woodland', being 'White Gum, near Queanbeyan'. (One can only hope that if they meant Canberra they would have said so.)

New information from these rounds of habitat-oriented atlassing will be awaited. While the enormous flurry of effort being stimulated deserves admiration, this columnist wonders whether we will be much further ahead than if we had had the benefit instead of 150 extra years of the acute observing of Gould and Gilbert.

A. stentoreus

Birding in Cyberspace, Canberra Style

Winter is the best time of the year for Canberra birding, as it gets us out of the house and into the bush. Otherwise, we'd just be sitting there staring into the computer's little screen reading about birding! So, since you may have missed the Australian email announcement and discussion list Birding-Aus lately, here are a few highlights of special interest to Canberra birders.

A discussion on **good and bad birds** focused especially on Common Mynas, Common Starlings, feral pigeons and similar unpleasantnesses. I won't go into the details, but must pass on one gem from Hugo Phillips. Talking about lousy mynas, he reported that he 'had the experience of living in a house with mynas nesting in the roof directly above a bathroom exhaust fan, which was sited directly above the toilet, so that people sitting there were showered with little reddish mites'. Add that to your life list of birding experiences!

The internet can be an aid to **atlassing.** Birding-Aus list members have been directed to the wonderful web site hosted by the Australian Broadcasting Corporation (http://www.abc.net.au/birds) that presents data collated by Birds Australia from the atlas data base. It is a wonderful resource, with interactive bird distribution maps and a facility for you to produce bird lists for particular localities (just move your mouse over the grid for the State of interest and, with a few clicks, you have the list). Furthermore, you can type in your atlasser **ID** number and receive a list of your contributions. The site has other wonderful resources; do check it out — use your local public library's internet-enabled computers if you do not have access to the internet elsewhere.

One avian species not commonly seen in COG's area of concern is the **Spotted Turtle-Dove,** an exotic which is endemic to Asia. It is common in other parts of Australia including Melbourne, the home of Birding-Aus list maintainer Russell Woodford, who commented:

> Spotted Turtledoves (henceforth SPTDs...) are doing rather well at the moment. It is one of the species I see most frequently, and certainly seems as numerous as ever, if not more so. Of course, I haven't any data to backup this claim — it's just a feeling.

This raises three interesting points: (1) why is Canberra relatively free of this exotic species, while infested with others? (2) is it time for Australian birders to settle on a uniform technique for abbreviating the English names of bird species? and (3) what a wonderful thing the Canberra Garden Bird Survey is, giving us the data essential for monitoring changes in the abundance and distribution of potentially problematic species like turtledoves!

`How do they know?' asked Roy Sonnenburg. How do the pelicans, stilts and other species know that Lake Eyre is filling and providing a perfect setting for an epidemic (or is it orgy?) of breeding? How do they know when to leave the coastal regions and where to go to? Not a new question, but list members proffered some new answers — suggestions, anyway. Here is a sample, to be read as written: very much with tongue in cheek.

- 'Those bill pouches ton pelicans] are not just used for fishing, they also generate very low frequency sounds ... which are directed inland. When the lakes are **full,** the return echoes are distinctly different and the pelicans go there to breed.' (Peter Woodall, admitting that this is a complete fabrication, and welcoming offers of a fat grant to visit the area to explore his hypothesis.)
- 'The birds are very sensitive to atmospheric clues i.e. air pressure and humidity' (Richard Johnson).
- 'When pelicans fly high and circle they can see a long long way ... they can tell whether Lake Eyre, or whatever else, is full!!!! I've known pelicans who've seen God, Harold Holt, lost socks from our tumble dryers...' (LGJ).
- 'The comments about pelicans and infrasound is certainly an interesting one...Given the Lake Eyre is a salt lake and that salt water is conductive, it's possible that the salt water has a measurable effect on the Earth's magnetic fields. Birds are known to use magnetic fields for navigation, so it's not unreasonable that they can detect such changes. They may also detect air pressure and/or humidity changes accompanying the weather systems likely to fill the lake. Cases where flocks of waterfowl have turned up unexpectantly in arid areas after being "tricked" into thinking water was present would be very interesting to hear about.' (Paul Taylor)
- 'As to the birds then travelling to where the lakes are, it is well-known how ducks are adapted to fly long distances very fast, and Pelicans can use their size to save energy by gliding. Both these adaptations means that it shouldn't be impossible for either ducks or Pelicans to go and have a look, to scout out, and if there is no water, or insufficient water, to return immediately. Are there any records of numbers of waterfowl or Pelicans suddenly leaving a coastal area in a good year, and then returning a few days later? Our regard for birds amazing adaptations shouldn't blind us to the possibility that they may use trial and error tactics on occasions too.' (John Leonard)
- think they must have scouts with satellite phones.'

- 'Is it likely that great mobs of birds all head off, leaving a perfectly good lake, on what might be a wild goose chase (sorry)? And if its just the odd one or two that discovers the water (a) why would they return to tell the others and (b) how would they communicate it? (like bees?) Last question. What attracts them? Why should new waters inland, hours and hours of flying time away, attract them away from plenty of water and rich feeding grounds at (say) a sewage works in the south east?' (Pat O'Malley)

- 'It's just the Bush Telegraph. I'm sure birds talk amongst themselves just like us humans. If you want to find out anything, there's nothing better.' (Peter Pfeiffer)

- `What about smell. It is recorded that some insects have an amazing sense of smell. Do birds?' (Andy Burton)

- 'Yes, there's probably a 'humans-aus@birdnet.net.au' that some mistletoebird is sending an e-mail to right now. That e-mail will be read by various other wattlebirds, honeyeaters and parrots. The mail is probably about us wrecking the environment.' (LGJ)

So ... the answer still seems to be ... dunno!

I bet you really wanted to hear about Allan Benson's `Encounter with the NSW Police', aka **'The Cop and the Nightjar'.** But sorry ... out of space! Look for this cyberbirding gem in the next issue of *Canberra Bird Notes.* Meanwhile, switch off that computer, grab your bins and get out among it. Remember this column's motto: 'There's more to birding than the Internet!'.

T. alba

Details on how to subscribe to Birding-Aus are on the web at http://www.shc.melb.catholic.edu.au/home/birding/index.html, and a comprehensive searchable archive of the messages that have been posted to the list is maintained by Andrew Taylor at http://www.cse.unsw.edu.au/birding-aus.

To join the Canberra Birding email discussion list, send a blank email message to canberrabirds-subscribe@topica.com, or join online at http://www.topica.com/lists/canberrabirds.

Annual COG subscriptions for 2000 are:

Individual, family or institution - $30
Student (18 or younger) - $15

Canberra Bird Notes is published by the Canberra Ornithologists Group Inc and is edited by Harvey Perkins and Barbara Allan. Major articles of up to 5000 words are welcome on matters of the distribution, identification or behaviour of birds occurring in the Australian Capital Territory and surrounding area. Contributions on these topics should be sent to Harvey Perkins, 42 Summerland Circuit, Kambah ACT 2902, or via email to harvey.perkins@anu.edu.au. Short notes, book reviews and other contributions should be sent to Barbara Allan, 47 Hannaford Street, Page ACT 2614 or via email to bmallan@dynamite.com.au. If you would like to discuss your proposed article in advance, please feel free to contact Harvey on 6231 8209 or Barbara on 6254 6520.

COG's Annual Bird Reports are incorporated in an appropriate issue of *Canberra Bird Notes.*

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