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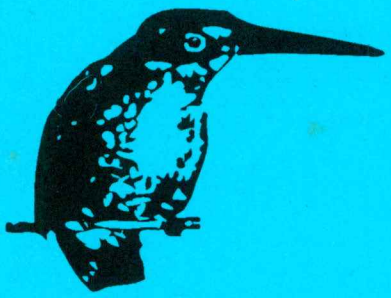

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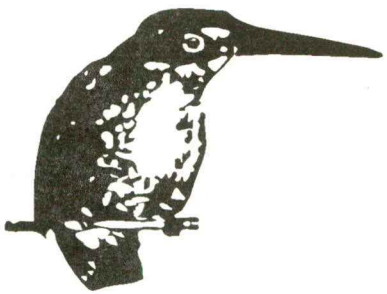

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BREEDING BEHAVIOUR OF A PAIR OF SQUARE-TAILED KITES

S.J.S. DEBUS, R.D. EARLE, G.J. MILLARD and C.R. PARKER

SUMMARY

An active nest of the Square-tailed Kite *Lophoictinia isura*, on the North-west Slopes of New South Wales, was observed during the downy chick stage from 3 to 17 November 1991. The nest was beside a highway, in a small (25 ha) patch of eucalypt woodland in farmland. The attempt failed: the nest fell down during a period of strong winds, but the chick may have died earlier through food shortage. Parental roles, voice and behaviour are described. The male took a more active role in nest attendance than in most previous accounts. The continued existence of the pair's nesting patch, a traditional breeding site, is in some doubt through the possibility of clearing.

INTRODUCTION

The breeding behaviour of the Square-tailed Kite *Lophoictinia isura* has been described previously (A.C. Cameron 1976, Cupper & Cupper 1981, Johnston 1983, Schulz 1983, Hollands 1984, Ferguson & Bonnin 1987, Morcombe 1990, C.A.C. Cameron 1992).

Several of these accounts concern a single pair in Queensland watched by different observers, mainly in the later stages of the nestling period. This may have resulted in a somewhat biased and misleading view of the role of the male in parental care, reinforced by recent summaries of the species' biology (Schodde & Tidemann 1986, Debus & Czechura 1989). A relevant aspect of the Kite's ecology is its almost total dependence on nestling and fledgling passerines as a food source during its own breeding cycle: it preys particularly on friarbirds *Philemon* spp., miners *Manorina* spp. and other honeyeaters that build suspended nests in the foliage of eucalypt open forest and woodland (see Debus & Czechura 1989).

In November 1991 we observed an active Square-tailed Kite nest for 20 hours over eight days, during the downy chick stage, in the North-west Slopes region of New South Wales (exact locality withheld). As the nest failed, and as the male's behaviour differed from that described in some other accounts, we present the observations in full. Some of our behavioural observations represent new information, previously undescribed for this species.

METHODS

Observations were made from the ground or a parked vehicle (with doors and windows open), about 30-50 m from the nest, with the aid of binoculars. The nest was watched for four, five and six hours on 3, 6 and 7 November respectively, in the middle of the day (09:30-16:30 hrs), by SJSD. Thereafter it was watched for 30-90 minutes per day on five days, twice in early-mid morning (07:45-11:00 hrs) and three times in mid-late afternoon (15:00-17:50 hrs), by RDE (9, 12, 15, 17 November) and GJM & CRP (10 November). All times are given as Eastern Standard Time.

NEST SITE AND HABITAT

The Kites' nest site was on the western boundary of the Northern Tableland region as defined by Morris et al. (1981), and in the North-west Slopes region defined by McAllan & Bruce (1989); it was in vegetation typical of the slopes rather than the tablelands. The Kites' 1991 nest was about 10 m above ground, on a fork on the sloping branch of a mature, live White Box *Eucalyptus albens*. The nest was on the exposed north-west side of the tree, and took the full force of strong westerly winds on 7 November. The tree was beside a major highway, the trunk only 10 m from the edge of the bitumen, but the nest was on the far side of the tree (c. 20 m) from the road. There was only intermittent traffic noise. The tree was in a 25 ha block of vacant Crown land, about 2 km from a major town and within a zone of high-density rural holdings. The block was mostly covered in mature White Box woodland, but was disturbed and rather open, with several patches of sapling regrowth in formerly cleared areas.

Two older nests were in almost identical situations, within 200 m of the active nest, and across the highway in a 5 ha patch of White Box woodland surrounded by cleared land. Both nests were surrounded by tree crowns on most sides, in a denser patch of mostly old

trees, and were less exposed to westerly winds. They were characteristically flat platforms c. 10 m above ground on sloping forks of mature, living White Boxes, and had evidently been built by Square-tailed Kites (i.e. typical *Lophoictinia* site and construction; raptor nests are readily referable to the respective genus). Local residents considered that the Kites had been nesting annually in the area for some years. One nest was about 30 m from the highway, and the other was somewhat deeper into the woodland patch, c. 100 m from the neighbouring nest and 50 m from the road. The airspace between the closer nest and the road was partly occupied by a dense, multi-layered belt of telegraph lines. In 1991, Little Eagles *Hieraaetus morphnoides* were using the old nest farther from the highway.

The 1991 nest was difficult to see. Initially, SJSD drove slowly past it without seeing it (with both adults on it) while searching, and GJM and CRP had difficulty finding it, in both cases with explicit directions. The nest was originally found, by J.E. Courtney, only because one bird flew across the road in front of him and landed on it. Cameron (1976) remarked that nests were difficult to find because of the adults' cryptic behaviour.

The male Kite appeared to do most of his hunting well away (>1 km) from the nest, in some instances soaring up to a high pitch and gliding out of sight in a southerly or south-westerly direction. There were some thousands of hectares of eucalypt and *Callitris* open forest and woodland along and beyond a river, 1.5 km to the south.

INCUBATION

The nest was located on 21 October at about 09:00 hrs, when J.E. Courtney saw an adult fly to the nest and stand on it, beside the other adult which was sitting flat in the nest in the incubating posture (as opposed to the often more alert, restless posture, higher on the nest, of raptors brooding chicks, e.g. Brown & Amadon 1968; SJSD pers. obs.). Both adults remained on the nest during the few minutes that Courtney observed them.

NESTLING

From 3-10 November, the adults' behaviour (feeding, guarding, shading: see below) strongly indicated that there was a small chick in the nest, presumably hatched since 21 October and therefore not more than two weeks old at the start of observations. On three days the female tore small pieces of prey and offered them in her bill to the chick, which took each piece before the next was offered. The chick was not visible or audible at feeding times, and must therefore have been newly hatched. An older (larger) chick would have been visible in the shallow nest, and audible at feeding times (cf. Johnston 1983, Schulz 1983, Hollands 1984); other sounds from the nest were audible 30 m away, and were not masked by the infrequent traffic noise.

PARENTAL BEHAVIOUR

The daily pattern of behaviour was somewhat different over the three days of

intensive observations, 3-7 November. The sexes were distinguished by size, plumage and copulatory behaviour (see below).

3.11.91. 12:35-16:35 hrs. The female stood on the nest for 3.5 hours, then moved to a branch below the nest for 20 minutes, and to a dead tree across the road for the final 10 minutes where she remained at the end of the session. While on the nest, she shaded the chick once for about 5 minutes at 13:10 hrs, the hottest part of the day (calm and sunny, max. 29° C). She crouched back-to-sun, on the north side of the nest, and spread her wings. The male visited the nest twice without food (12:52 and 13:10 hrs), on the second visit staying for 45 minutes. He stood beside the female, squatted on the nest, and shaded the chick for a few minutes at 13:30 hrs. It was apparent from their behaviour, e.g. peering down and gently manoeuvring on the nest, that the adults were deliberately shading the chick beneath them. At one point the male had a wing spread over the female. Later, he visited the nest twice with food (15:11 and 15:54 hrs), on the second visit staying for 5 minutes. The female ate the first food item, and fed the chick on small pieces of the second item. Finally, the male returned (without food) at 16:00 hrs and copulated twice before departing at 16:05 hrs.

6.11.91. 09:25-14:25 hrs. Both adults were absent for the first hour, then the female arrived alone with prey. She fed herself then the chick, and stood on the nest for the rest of the session, shading the chick at 12:36 and 13:00 hrs for a few minutes (calm and sunny, max. 32°C). The male visited the nest twice (10:51 and 12:53 hrs) without food, staying for 10 and 25 minutes and copulating twice on the second visit.

7.11.91. 09:30-15:30 hrs. Both adults were absent for the first half-hour, then they soared over and the female perched in a dead tree across the road for 50 minutes. She then perched in a live tree next to the nest tree for 95 minutes, eventually going to the nest at 12:25 hrs where she stood for the rest of the session (but did not shade the chick, despite a maximum of 33°C; however, the weather was mainly overcast with a strong wind). The male visited the nest, without food, at about 12:40 hrs for 15 minutes during which they mated once. Neither adult brought food, nor was the chick fed, during the entire six hours.

9.11.91. 16:50-17:50 hrs. Both adults perched in the nest tree, preening, for the hour.

10.11.91. 07:45-08:15 hrs. Both adults arrived at the nest together at 07:45 hrs, one with prey. One immediately departed, and the other fed the chick for a few minutes then perched beside the nest for the remaining half-hour. This was the last day on which there was firm evidence of a chick.

12.11.91. 15:30-16:00 hrs. The female perched in the nest tree, preening, for the half-hour. The male was absent.

15.11.91. 15:00-16:30 hrs. Both adults perched beside the nest, the female for the entire 90 minutes. At 15:35 hrs the male left.

16.11.91. The nest was checked briefly in the morning during rain. Neither adult was visible.

17.11.91. 09:45-11:00 hrs. Both adults were in a tree next to the nest tree. They flushed when a semi-trailer parked beside the tree, and did not return.

FEEDING RATES AND NEST ATTENDANCE

Only four prey deliveries were seen in 20 hours (0.2 per hour or one every 5 hours on average), all small items. The chick was fed on three of these, on average one feed every 6.7 hours. The chick's meals lasted 4-8 minutes.

Excluding the time she was disturbed on 17 November, the female spent 55% of 18.5 hours' observation time standing on the nest and 22% perched in the nest tree. She spent 14% of time perched in other trees within sight (100 m) of the nest, and 2% feeding the chick. She was absent, and the nest unattended, for 7% of the time. Her attendance at the nest, either on or beside it, declined from 85% (plus 11% in the nest tree) on 3 November to 49% (plus 3% in the nest tree) on 7 November. However, on 7 November she was in trees within sight of the nest, and thus guarding it, for a further 41% of time.

The male was not present in the female's absence. He was mostly absent (70% of time), but he spent some time standing on the nest (13%) or in the nest tree (13%). He sometimes perched in trees within sight of the nest or circled overhead (4%). He did not feed the chick. On two occasions (3 and 6 November) when he visited the nest without prey he had a full crop, indicating that he had fed himself during his absence but caught no surplus to bring to the nest.

Except for the semi-trailer, which the Kites apparently perceived as threatening, the behaviour of the birds was not visibly influenced by the presence of observers or vehicles. They ignored people and road traffic within 30 m, and when the female was on the nest or in the trees her only reaction to a person directly below was to peer intently downward. She did not flush from the nest, and when she approached the nest in the presence of observers she landed without hesitation or apparent alarm. Other observers have also noted the quiet and confiding nature of this species at the nest, in the presence of humans and vehicles (e.g. Cameron 1976, Cupper & Cupper 1981, Johnston 1983, Hollands 1984).

DIET

Five food items were seen delivered to the nest:
(1) two unidentified fledgling or advanced nestling birds, brought simultaneously by the male, species' adult weight about 20 g (both swallowed whole by the female);
(2) an unidentified free-flying 20 g passerine, apparently caught by the female because she brought it to the nest, in the male's absence, after being absent herself for an hour;
(3) a small (<20 g), unidentifiable but fleshy (i.e. vertebrate) item, brought by the male, and fed piecemeal to the chick by the female;
(4) an unidentified small item, brought by one adult when both arrived together, and fed

piecemeal to the chick.

Only one pellet, presumably cast by the female, was found below the nest on 6 November. It was mucus-coated, tapered and slightly flattened, measuring 44 x 21 mm. It consisted of small, grey-brown passerine feathers and a trace of beetle fragments. A few feathers tinged olive-yellow suggested Fuscous Honeyeater *Lichenostomus fuscus*, the common local honeyeater of woodland. Elsewhere in the region, attempted predation on a fledgling Fuscous Honeyeater by a different adult Kite has been observed (Debus 1990a).

HUNTING BEHAVIOUR

No captures were observed, but the male was seen setting off on hunting flights several times. It appeared that he sometimes explored his territory, within 200 m of the nest, for food before departing for more distant hunting grounds. At 13:57 hrs on the first day he flew south across the road, circled then dipped suddenly to the tree canopy, with his wings in a steep dihedral, before disappearing over the treetops. This may have been an abortive attack or an exploratory swoop. At 15:19 hrs he left the nest and soared high, gliding south-west out of sight. On the second day at 14:17 hrs he combined both these manoeuvres: at first circling low over the trees south-east across the road, quartering the canopy, then circling high and drifting south then south-west in a long glide out of sight. On the third day he left at 12:52 hrs in a south-westerly direction, low over sparsely treed grassland which he quartered in direct flap-and-glide flight like a harrier *Circus* sp. On this, a day of strong wind, no food was brought in six hours and he did not have any crop distension indicating a meal; it seemed that strong wind depressed his hunting success. On 15 November at 17:35 hrs he flew directly at treetop height in an easterly direction. When he returned from one absence, he demonstrated his agility by gliding slowly and buoyantly through the crown of the nest tree, between the main branches, to land on the far side of the tree. Hunting behaviour of a different Kite in the region was described elsewhere (Debus 1990a).

VOICE

The calls of the Square-tailed Kite are poorly described. The adults under observation uttered a range of calls, as follows.

(1) An incessant begging call by the female whenever the male was on the nest with her, without food: a falsetto, slightly hoarse or wheezing squeal *ee-ee-ee...* of two syllables per second. This call was uttered softly, barely audible from 50 m.

(2) A brief, shrill chitter or trill, one second in duration, recalling the chittering of a begging female Little Eagle though not interspersed with piping notes (cf. Debus 1983). It was similar to the rapid, shrill chitter of a Collared Sparrowhawk *Accipiter cirrhocephalus* (cf. Debus et al. in press), though richer and of shorter duration. It was uttered softly by the female on the nest, once after she arrived with prey and once when the male arrived without prey.

(3) A clear, musical and plaintive yelp, half a second in duration, uttered singly but repeated at about two-second intervals. This was given rather softly by the female as she approached the nest with prey, and by the soaring male during a territorial encounter with a Little Eagle. This is the yelp described by Morcombe (1990), and the *keaw-keaw* described by Garnett (in Debus & Czechura 1989).

(4) A high-pitched, short and hoarse or wheezing yelp, *yip-yip-yip...*, one syllable per second. It was uttered by the female as she peered around after arriving on the nest with prey; she then broke into longer yelps *eep-eep-eep*, in quality recalling the falsetto, wheezing shrieks of squabbling Galahs *Cacatua roseicapilla*. The short, hoarse yelps were uttered in several other contexts:
(a) softly on the nest after the male arrived without food (apparently by the female);
(b) by the female as she landed in a dead tree across the highway, after soaring with the male;
(c) by both adults as they soared together after the male interacted with a Little Eagle, and then by the female as she returned to the nest and as she displaced the male from the nest.
This is presumably the "hoarse contralto yelp" described by Hollands (1984).

(5) A short, hoarse yelp with a rattle at the end, *eek-k-k...eek-k-k...eek-k-k*, repeated at one-second intervals, and recalling the rapid cackle of a Brown Falcon *Falco berigora*. It was uttered by the female as she peered up at an intruding adult Square-tailed Kite overhead (while the male was also on the nest), and appeared to be a territorial call. A loud version of this is given in undulating display flight (Garnett in Debus & Czechura 1989).

(6) A mating call, given by the male while he copulated: a slower and slightly hoarser version of the female's begging *ee-ee...* squeal, one syllable per second.

Most calls were soft and uttered infrequently. The male was usually silent, and did not give a food-call when approaching the nest with prey.

DISPLAYS AND TERRITORIAL DEFENCE

The adults defended their nesting territory against other predatory birds, and an intruding conspecific. The female flew purposefully and directly from the nest tree, across the highway to displace a corvid *Corvus* sp. from a dead tree. When two Australian Magpies *Gymnorhina tibicen* landed in the top of the nest tree, the female Kite became agitated and moved to a higher branch, whereupon the Magpies left. On two days a Little Eagle soared over its own nest site (the Kites' old nest site), 200 m from the Kites' active nest, without eliciting a response. However, on the third day the male Kite and Little Eagle engaged in an aggressive interaction in the airspace between their respective nests. Both were soaring and made alternate short, shallow swoops at each other. The Kite was yelping, and was the more aggressive of the two. Both Kites then soared together, yelping. The female twice displaced the male from the nest when he attempted to land there, perhaps to induce him to repel the Little Eagle. Both Kites soared again, and the female returned to the nest with

short, stiff wing-beats, yelping as she arrived. In a strong head-wind she was quite bow-winged when gliding, unlike the usual shallow to moderate dihedral of this species.

On 6 November at around 11:00 hrs when both Kites were on the nest, the female peered up and called in an agitated manner at a third adult Square-tailed Kite soaring high overhead. She then lunged at the male, who had been loafing with a full crop and seemed reluctant to move. She lunged again with open bill and wings, and forced him off the nest by stepping forward and pushing his breast with an open foot. This may have been to induce him to repel the intruder. He soared in several low circles with his legs lowered, then climbed, circling high and flapping, and chased the intruder. The intruder avoided him by a sharp turn at each pass. The pursuit was slow and leisurely, and after 10 minutes both were lost to view at a great height, heading about 1 km south-west.

ALLOPREENING AND COPULATION

The adults allopreened on two occasions over three days while the male was standing on the nest with the female. One preened the other's head and neck feathers. On a third occasion, the pair engaged in reciprocal allopreening while copulating.

The pair copulated five times over three days when there was a chick in the nest. On the first day, the pair mated twice in five minutes while perched below the nest. The male flew in and alighted on the female's back, then perched beside her between mountings. On the second day they mated twice in 24 minutes, on the nest, while the male was standing on the rim with the female. They allopreened between mountings. On the third day they also mated on the nest once, during the male's 15-minute visit. On no occasion was mating preceded by food-presentation or other preliminaries: the male mounted spontaneously, and the female then crouched slightly. Mating was prolonged and unhurried, in one case lasting over a minute, and the male stood on the female's back for a further few seconds before dismounting. After mating, the pair stood side-by-side and preened.

SEXUAL DIMORPHISM AND MOULT

Both Kites were in full adult plumage, not immature or subadult (i.e. second-year) plumage, in which the species sometimes breeds (cf. Bonhote 1906, Serventy & Whittell 1976). There was little size difference between the adult Kites. Side-by-side on the nest, the male looked neater than the female, which was slightly (perhaps 5%) larger and more robust. The male had a greyer face, particularly the ear coverts, a tendency noted by SJSD in male museum specimens. It is not known if this is a general or consistent character in adults.

The female Kite was moulting her inner primaries. The male was not moulting, except possibly a central rectrix. The intruding, presumably non-breeding adult was moulting its primaries heavily. In another pair, observed elswhere in the region in December 1989, one (presumably the female) was moulting its inner primaries (Williams 1992). It thus

appears that, as in other raptors, moult in the sexes in a breeding pair is out of phase: the female moults while inactive and tied to the nest, and the male moults later when the female is free to hunt (e.g. Cramp & Simmons 1980).

OUTCOME OF NESTING ATTEMPT

The nest was found upside-down on the ground on the morning of 20 November, with no sign of the chick under or near it (J. Courtney pers. comm.). The nest and supporting branch had been tossed around violently by strong winds during the observation period, when another observer (K. Holdsworth) remarked that the nest looked "precarious". An interested and sympathetic local resident, whose house was in full view of the nest, also reported the nest on the ground. There were no suspicious circumstances and no evidence that the nest had been interfered with by humans. On 23 November the nest and site were re-examined by SJSD. There were no traces of a chick or other nest contents (e.g. prey remains, eggshells) nearby, and no sign of the adults between 13:00 and 14:00 hrs. The chick was too small on 6-9 November to have fledged by 20 November, and the nest therefore failed.

THREATS

The 1991 nest was on land that may be sold to private interests, under the present State Government's policy of disposal of vacant Crown land. According to local sources, the Department of Conservation and Land Management has received offers to buy the block by an influential neighbour who wishes to clear it. These offers have been refused to date and, according to CALM staff, the block is not due for consideration for a further four years. A land assessment, as yet not carried out, is required before the block can be considered for disposal and such land assessments by the Department include fauna conservation values. Any such fauna assessment should be carried out in the appropriate season (spring-summer) when migratory species such as the Square-tailed Kite are present.

The area is a traditional breeding site for a species classified as threatened in New South Wales (National Parks and Wildlife Act), and nationally (Brouwer & Garnett 1990). The presence of such a species is one reason for retaining the block's natural tree cover, under protective, Crown ownership. Local sources described the block as the only piece of natural bushland in the immediate vicinity, with subdivision of bushland to the north imminent. The Kites' patch was the only one known to be used by them for nesting, and the only apparently suitable one, in the immediate area.

DISCUSSION

The Square-tailed Kites' nest site suggested that the species can breed in a small patch of habitat near houses, farms and road traffic. A cluster of nests in a traditional territory is typical for the species (see Debus & Czechura 1989), and the three nests were characteristic of *Lophoictinia*. From the presence of old nests and local reports, a pair has

probably nested at the site for years, largely unnoticed, as the adults and nests were inconspicuous. An important requirement would appear to be a large area (several square kilometres) of suitable hunting habitat within commuting distance: eucalypt open forest and woodland rich in nesting passerines, particularly honeyeaters, on which the Kite depends for food (see Debus & Czechura 1989).

From ecological theory and research on soil and foliage nutrients and bird abundance (e.g. Recher 1985), the Square-tailed Kite's richest hunting habitat would have been on fertile soils. In New South Wales these are now largely cleared for agriculture, particularly the richer sites such as river valleys. The remaining box-ironbark forests and woodlands on the North-west Slopes probably support a significant, if sparse, breeding population of Square-tailed Kites, our breeding record being one of the few from New South Wales. The North-west Slopes may be a stronghold for the Kite in New South Wales, as for the Regent Honeyeater *Xanthomyza phrygia*.

The appearance of a third adult Kite (not a yearling, i.e. not the previous year's offspring) in the pair's territory is a remarkable occurrence for a supposedly rare bird. Furthermore, there was a second active nest about 80 km to the north-east, on the tablelands, in November 1991 (M. Stanton pers. comm.). These records provide additional support for a revised view of the species' distribution and status. Contrary to popular belief that the Kite is an inland species, in south-eastern Australia it is primarily a bird of forests and woodlands from the coast to the inland slopes of the Dividing Range (see also Debus 1991, Debus & Silveira 1989). The occurrence of breeding birds should be expected on the coast, tablelands and slopes on both sides of the Great Dividing Range in dry forests and woodlands.

The ultimate failure of the Kites' breeding attempt was caused by nest collapse, apparently a hazard for this species: Cameron (1992) noted that some nests were frail and blew down before the next season. However, the pattern of events at the nest 3-17 November suggested that the chick may have died before the nest fell down. The parental feeding rate was much lower than recorded at successful nests, in frequency and in the size and number of items delivered per visit (cf. Cameron 1976, Hollands 1984). The female's presence on the nest declined, she participated in hunting and she apparently did not brood in rainy weather. This was at a stage of the cycle when, by all other accounts, she should have been in constant attendance at the nest (i.e. on or beside it, e.g. Cameron 1976, Cupper & Cupper 1981, Hollands 1984, Jolly 1989). Raptor prey delivery rates, maternal participation in hunting and chick survival are related to food supply (e.g. Newton 1979). Parental inexperience is unlikely to have been a factor at the Kites' nest, because both parents were fully adult. Furthermore, parental behaviour in raptors is instinctive, triggered ("released") by stimuli from the young (e.g. Brown & Amadon 1968); i.e. maternal care is not learned. The apparent decline in maternal care can be explained by a lack of appropriate behaviour from a weakening chick.

The evidence, together with the dry conditions and poor breeding season for local passerines, points to death of the chick through food shortage (either by starvation or by

exposure to weather or predators in the female's absence). For instance at Armidale, Noisy Friarbird *Philemon corniculatus* breeding activity was much lower in 1991 than 1990: 21 nests, 14 successful and 32 fledglings in 1990 versus eight nests and none successful in 1991 (H.A. Ford unpubl. data). 1991 was also a year of poor ironbark flowering on the North-west Slopes. It is possible that our observations on the Kites coincided with times of low hunting activity, but other observers have recorded feeding visits throughout the day at other nests (e.g. Cameron 1976, Hollands 1984). Furthermore, a family of raptors of around 500-650 g adult weight, preying on 20 g birds, would need to eat 3-5 such items per day each, assuming daily food consumption of 10-15% of body weight as in other similar-sized raptors (e.g. Little Eagle: Debus 1990b). We suggest that dietary specialisation and shortage of the Kites' major prey (nestling/fledgling honeyeaters) were the primary reason for their failed breeding attempt.

The male's parental behaviour and long stays at the nest contrasted with most other accounts, although Schulz (1983) noted that both sexes shared the brooding and feeding of small chicks at one nest, and Hollands (1984) noted that the male sometimes stayed for a few minutes at another nest with a chick. The female in this study was tolerant of the male on the nest, they allopreened and they copulated frequently and unhurriedly when they had a chick, all of which suggest a close pair-bond in this species. In these respects, and in its voice, displays and territorial defence, the Square-tailed Kite closely resembles the Black-breasted Buzzard *Hamirostra melanosternon* (see Baker-Gabb 1990). This provides further evidence for a close relationship between the two species (see Debus & Czechura 1989).

The Square-tailed Kite is a unique raptor, not at all like the Black Kite *Milvus migrans* in character and ecology, and not closely related to it. An endemic species in a monotypic genus, the Square-tailed Kite is a member of the "old endemic" Australasian raptor fauna (Debus & Czechura 1989, Olsen & Olsen 1989, Schodde in press). It is uncommon probably because of its specialised feeding behaviour and diet, which dictate a low breeding density; it has also probably declined through habitat loss (see Debus & Czechura 1989). It warrants detailed study and survey, to elucidate its true distribution and status and its ecological requirements. However, sufficient is known for appropriate action to be taken on the pair in this study, and on the species in general in New South Wales: breeding areas and adjacent hunting habitat should be identified and adequately protected against clearing and other disturbance.

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NOTES ON NESTING BLACK-BREASTED BUZZARDS AND OTHER RAPTORS IN STURT NATIONAL PARK

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INTRODUCTION

The breeding behaviour of the Black-breasted Buzzard *Hamirostra melanosternon* has been described by Cupper & Cupper (1981), Hollands (1984) and Baker-Gabb (1990), and most aspects of its behaviour have been reviewed by Debus & Czechura (1992). On 19-21 November 1990, I spent three days photographing and observing the Buzzard and other raptor species nesting in Sturt National Park, in the far north-west corner of New South Wales. This paper describes the behaviour of the Buzzards, which had at least one downy nestling.

STUDY AREA AND METHODS

The temperature in the little shade available was above 40°C, and there was no surface water in the immediate vicinity. The area was a dry, clay and mud flood-plain with

a bank of encircling sandhills. The banks had at some time confined water, which had long since sunk and/or evaporated, leaving a broken surface with large, open cracks. A group of long-dead, standing eucalypts supported raptor nests, some of which were in use and others appeared deserted. The surrounding area was an open plain with low sand-dunes covered in *Casuarina* sp. and *Eremophila* sp.

On a visit two months previously, I had noted large numbers of rabbits and kangaroos. In November those animals were spread more sparsely, but still in the general area. Non-raptors were plentiful and included Little Corella *Cacatua sanguinea*, Galah *C. roseicapilla*, Tree Martin *Cecropis nigricans*, Willie Wagtail *Rhipidura leucophrys*, White-winged Fairy-wren *Malurus leucopterus*, Yellow-throated Miner *Manorina flavigula*, Orange Chat *Ephthianura aurifrons*, Australian Magpie-lark *Grallina cyanoleuca* and Australian Magpie *Gymnorhina tibicen*. Some reptiles, especially lizards, were common.

Large numbers of Wedge-tailed Eagles *Aquila audax* were present, including a group of five which appeared to be a family party. Also present were Black Kites *Milvus migrans*, Whistling Kites *Haliastur sphenurus*, Brown Falcons *Falco berigora* in light and dark morphs, and a pair of Black Falcons *Falco subniger*. On the earlier visit I had also seen a Little Eagle *Hieraaetus morphnoides*, but this did not appear during the November visit.

I visited the nest sites each morning at about 08:00 hrs, staying until about midday, and again walked out to the site at about 15:00 hrs and stayed until 17:00 hrs. The Buzzards did not appear to be concerned by human presence unless an approach was made within 5 m of the base of the nest tree. The adult looked down from the edge of the nest but did not leave. No attempt was made to climb the nest tree or any other tree in the area, so although I knew that one chick was present, I could not be sure whether a second was in the nest. The Buzzards' nest was observed from an unconcealed position on the ground 15 m away. The Whistling and Black Kites, also nesting, left their nests if an approach was made within 50 m of their nest trees.

THE RAPTOR BREEDING COMMUNITY

There were five active raptor nests within a 100 m radius: one each of Black-breasted Buzzard, Black Kite and Black Falcon, and two Whistling Kite. The estimated distances, respectively, of these from the Buzzard nest were: Black Falcon 35 m north-east; Whistling Kite 100 and 120 m south-east (and 40 m from each other); Black Kite 200 m south-east (and 100 m from the closer Whistling Kite nest). There were three disused kite nests scattered up to 100 m west and south of the Buzzard nest, and a disused Wedge-tailed Eagle nest 1 km east-north-east.

OBSERVATIONS

Black-breasted Buzzard

Each day during the first hour of observation on the Buzzards, one adult (the larger, presumed female) either sat on the nest or stood on the rim of the nest while the other adult

(smaller, presumed male) roosted in a dead tree about 50 m south-east. During the whole time there was no interchange of positions or roles. Usually about an hour after my arrival, and again late in the afternoon, the male left his perch and circled the nest several times but on these occasions I could not detect any calling by either bird. The female then left the nest, circled the nest area and the pair disappeared in a north-westerly direction.

Well after the Buzzards had departed, either the Whistling or Black Kites nesting nearby left their own nest and circled high over the Buzzards' nest, then flew gradually lower, apparently interested in the contents. Immediately a Buzzard appeared directly above the intruding kite and spiralled down, shepherding the intruder away. At no time did the Buzzard attack the bird investigating the nest, nor was I aware of any threatening call. At no time did I see the defending bird approach: it suddenly appeared high in the sky above its nest. Once the intruding bird had been shepherded away, the defending bird flew off in the original direction.

The Buzzards' time away from the nest on these sorties varied between 40 and 70 minutes, and when they returned it was invariably with what appeared to be a kitten rabbit. The female brought the prey back, tore it into pieces and fed the chick(s), while the male returned to the roost tree. Neither adult was seen to feed itself. At no time did I observe both parents on the nest at the same time; in fact the male was not seen on the nest. After the morning feed the female stood for some hours on the rim of the nest, sometimes with her wings partly spread, apparently shading the nestling(s).

On one occasion I noticed the female bird on the nest rim cock her head and look upwards. Very high above was a third Buzzard circling the area, but other than to watch it until it disappeared, neither adult appeared concerned.

Black Falcon

There is virtually no published information on incubation behaviour of the Black Falcon. During one of the periods of inactivity at the Buzzards' nest, I saw movement in a deserted kite's nest in a tree, 20 m north-east of my position. I approached the foot of the tree and could see an eye watching through the loose sticks near the top of the nest. I therefore kept a watch from my original position near the Buzzards' nest. Eventually the sitting bird stretched, climbed to the nest rim and faced the opposite direction before disappearing down into the nest once more. It revealed itself as a Black Falcon, apparently incubating in the disused kite's nest. The change of position occurred about once per hour. However, I saw the sitting bird's mate on only one occasion: late in the afternoon it flew in to the nest, and within a few minutes one or the other adult flew off. The incoming bird perched briefly on a tree 10 m north-west of the nest; it apparently did not have food, and there was no calling or behaviour to suggest a food transfer. I had a brief view of one bird sitting higher in the nest than the other (which as partly out of sight being obscured by the rin), and I therefore could not tell the sexes apart nor determine which bird left. It is likely that this was an incubation change-over, the male possibly relieving the female while she left to hunt for herself.

DISCUSSION

Most aspects of the Buzzards' behaviour were similar to that previously described, particularly for the nestling period (Cupper & Cupper 1981; Hollands 1984; Baker-Gabb 1990). However, only one adult (female only) was on the nest at a time, the pair did not alternate roles, and the female on the nest was more confiding in the presence of humans than in previous accounts. The pair's aerial behaviour suggested that the female was both monitoring the male's hunting, and guarding the nest, from a high soaring position between the respective areas; perhaps she shared the male's kill before bringing it back to the nest.

I was not able to ascertain the outcome of any of the nests. As noted by the above authors, nests of different raptor species are often clumped along watercourses in the arid zone, with little interspecific conflict. However, I felt that the approach by Whistling and Black Kites in the Buzzards' absence was with more than casual interest in the nest. Some nestling predation occurs: the Buzzard takes Black Kite and other raptor nestlings (Cupper & Cupper 1981; Hollands 1984), therefore Buzzard nestlings may be similarly vulnerable to predation in the adults' absence.

In the absence of comparative data on other pairs, it is difficult to interpret the Black Falcons' behaviour. From what is known of incubation in other falcons (e.g. Cade 1982), it is likely that male and female Black Falcon share incubation.

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THE WHITE-WINGED CHOUGH IN THE DREAMING OF THE ABORIGINAL PEOPLE NEAR SYDNEY

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Birds feature prominently in several dreaming stories of Aboriginal people who traditionally lived in the Sydney area. Of the five linguistic tribes living within 100 km of Sydney, at least three, the Darug, the Dharawal and the Gundungurra, retain oral history of a bird or bird-spirit known variously as the duwan, dthuwangong, or twan. The Darug, including the Eora people, extended from the coast at Sydney west into the Blue Mountains. The Dharawal lived on the south coast between Botany Bay and Nowra, extending west as far as the Georges River. The Gundungurra occupied the southern parts of the Blue Mountains, including the Burragorang and Megalong Valleys, and along the Nattai, Wollondilly and Cox's Rivers.

One account of the duwan was recorded by Bernard Carlon, an early settler in the Burragorang Valley. Among his reminiscences about the Burragorang Valley in the 1840s was a reference to "Princess Queahgang" (probably gweagang), daughter of Moyengully, the "chief' of the Burragorang clan of the Gundungurra (cited in Meredith 1989). Carlon told of an incident when she was sick:

> Then came another report that Queahgang was bewitched by a spirit, that came in the form of a bird called Twan and had to be carried about.

This is almost certainly the same spirit-bird as a creature called the dthuwangong by Matthew Feld, who obtained his information from Gundungurra people living near Picton around the turn of the century. Feld (1900) states:

> They (the burragorang band of the Gundungurra tribe) had another superstition about a spirit they called dthuwan-gong, who lived among the rocks, and had enormous wings, with which he extinguished their camp fires, killed them and then eat (sic) their livers.

The Darug people shared this belief. An early French expedition to Australia, under the leadership of de Freycinet, crossed the Blue Mountains in 1819 (Freycinet 1824). One of the drawings of this expedition shows three figures representing Aboriginal rock engravings, and titled "Gods of the Blue Mountains". One of these is clearly a bird-like spirit, with distinct wings and a beak. It seems likely that this is an engraving of a duwan.

The belief in the malevolent nature of the duwan is also recorded for the Dharawal people. Eades (1976) includes the term duwan in her vocabulary of the Dharawal language, and defines it as an "enemy messenger bird".

The most interesting oral history of the duwan was passed on to me by two ladies of Darug descent. One was in her seventies, and her daughter was in her fifties. Their ancestry has been traced back to Yarramundi, the "Chief of the Richmond tribes", and his daughter Maria, who married a convict and lived near the original Black Town settlement (Brook and Kohen 1991). Both ladies had lived in various Aboriginal communities around Sydney, including the Katoomba settlement and at La Perouse.

They told me that the duwan was an indicator of bad news. One told me she had been visited by the duwan immediately before her husband died, and the other when her father died. They were able to provide a very good description of the duwan. They described it as a "medium size black bird, with big feet, and blood red eyes, which screamed out" to warn of impending disaster. Their description was so clear, that I was able to identify the bird with little difficulty. The duwan, in its animal form, was the White-winged Chough, *Corcorax melanorhamphus*. According to one description (Readers Digest 1977), it can be identified from the following:

> ..... sooty black all over .... eye red with an orange inner ring .... extreme alarm call an ear-shattering scream.

It is distributed throughout open woodlands and scrub in eastern and southern Australia. It was formerly common in the Blacktown area (J. Lawson, pers. comm.), and is still seasonally common near the Hawkesbury River.

The duwan is an interesting example of a dreaming bird with both a spiritual and a physical manifestation in the world of the Aboriginal people of the Sydney region.

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PACIFIC BAZA NESTING AT TUGGERAH

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Pacific Bazas *Aviceda subcristata* were found nesting on my property at Mardi near Tuggerah approximately 33°18'20" south 151°23'30" east on 16 January 1992. The nesting tree is a Spotted Gum *Eucalyptus maculata* 35m high, 60cm diameter at base and growing within 3m of a well used farm access road. The tree is growing on the 30m contour line at the base of a 150m timbered hill. It is in a group of trees with open grassed grazing areas to the east and west.

Just below the nest the main trunk forms three branches each about 10° from vertical. On one of these, small branches grow towards the other two and it is on these small suckers that the nest is formed. The nest appears to sit centrally between the three branches about 30m above the ground. The nest is about 40cm x 15cm and seems to be constructed of leafy branches rather than sticks. It looks more like a squashed Ring-tailed Possum *Pseudocheirus peregrinus* nest than the usual raptor's nest.

Unfortunately the birds and nest were not found until the two young were almost ready to leave the nest. By the 20 January the young were seen away from the nest being fed by the parent birds. The parent birds were seen chasing after cicadas, the common one in the vicinity of the nest being the Flourery Baker *Abricta curvicosta*. Items of food fed to the young included large green caterpillars similar to a large Hawk Moth caterpillar *Sphingidae*, a skink type lizard and leaf insects *Phasmatidae*.

Nesting must have begun in November 1991. The fact that they were not seen earlier testifies to their unobtrusive behaviour. Before leaving for a Christmas bird camp I had been watching a pair of Leaden Flycatchers *Myiagra rubecula*, with a nest in the same tree and within 9m of the hawks' nest. During this time the hawks must have had eggs and hatchlings without being observed. The Pacific Baza were last seen on 1 February 1992.

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LONG-TOED STINTS IN NEW SOUTH WALES

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SUMMARY

Long-toed Stints *Calidris subminuta* are uncommon and irregular visitors to New South Wales in the non-breeding season. The following notes refer to 17 observations of Long-toed Stints over an extended period at a permanent inland swamp in the Murrumbidgee Irrigation Area of New South Wales. Plumages, calls and behaviour are discussed in some detail and comparisons with other wader species and habitat preferences are considered where they may offer some help in identification and location of this elusive species. In Australia Long-toed Stints are easily overlooked but once located are easy to identify. The potential problem of confusion with Least Sandpiper *C. minutella* which has not yet been recorded in Australia has been considered. As a consequence of these observations and some anomalies and uncertainties discussed, it is recommended that detailed written descriptions, including calls, of all pale-legged stints seen in Australia should be made and that photographs would be invaluable for subsequent perusal and records appraisal.

INTRODUCTION

The Long-toed Stint is an Eastern Palaearctic species which nests in a wide variety of arctic and boreal habitats regularly south to 50° N. The breeding range is incompletely known. Outside the breeding season Long-toed Stints are found mainly around fresh waters but may also venture on to tidal mud flats. They generally feed singly or in small flocks often among vegetation at the water's edge or on floating weed or algae (Hayman *et al.* 1986). Like all small calidrids Long-toed Stints are highly migratory, but their migration routes are poorly known. Most winter in SE Asia and the Philippines, but a few hundred reach Australia each year and small numbers occur in the Middle East on passage which suggest a few may winter regularly in East Africa.

In Australia the Long-toed Stint is a regular summer visitor and has been recorded throughout the country. The species is most abundant in Western Australia where it usually occurs in small parties with exceptional groups of 80 and 92 having been reported. In Eastern Australia reports are generally of one to two birds (Blakers *et al.* 1984). In his recent review of shorebirds in Australia Lane (1987) made no reference to records from New South Wales. However, Long-toed Stints have been recorded in New South Wales since 1969 when one was seen by John Hobbs at Dareton (Morris *et al.* 1981). Long-toed Stints have been recorded irregularly and infrequently at widely separated localities in New South Wales since then. The following notes refer to several observations of Long-toed Stints at Fivebough Swamp.

STUDY AREA AND METHODS

Fivebough Swamp, near Leeton, is a natural inland fresh water marsh located on the Eastern margins of the Riverine Plain of New South Wales. Summers are typically hot with temperatures reaching in excess of 40°C, and winters are cool with overnight frosts. Rainfall is low but is fairly evenly distributed throughout the year with October the wettest month and December the driest.

In summer evaporation greatly exceeds precipitation. Net evaporation for the period October to March inclusive is approximately 800mm. Between April and September net evaporation is only 65mm. These figures are averages, in practice there are very large annual variations in temperature, precipitation and evaporation rates which result in problems associated with severe drought in some years and severe flooding in others. Notwithstanding this the strongly seasonal pattern of evaporation has a dominant effect on the conditions of the wetland area. Mud flats are a feature most of the year with brackish pools in summer. The site has been modified for waste water disposal from sewage treatment works, irrigation overflows and local drainage. Fivebough never dries out completely even in times of severe drought.

The swamp basin is intensively grazed by cattle and horses and the environment of the area has been severely affected by this over the years, and by ploughing and seeding with improved pasture species, fertiliser treatments, complete elimination of trees and "topping" of weedy pastures. Hay feeding of drought affected stock and irrigation run-off have resulted in a wide variety of weed species being introduced into the area.

Over a period of ten years from 1982 Fivebough Swamp has been visited regularly, on a weekly basis where practical, for the purpose of recording shorebird movements.

Optical equipment used for most observations were a combination of Zeiss (West) 8x20X binoculars and a 20-60x77mm Kowa TSN2 telescope mounted on a Slik SL-67 tripod; this combination was upgraded to Optolyth Alpin 8x30 binoculars and a 20-60x77mm Kowa TSN4 telescope from November 1991.

OBSERVATIONS

My first observation of a Long-toed Stint was on 26 October 1985. It was 07.50 (Eastern Australian Standard Time), on a clear, almost cloudless morning with a strong SE breeze. The water level in the swamp was very high following the wet winter. Wader species present included Sharp-tailed *C. acuminata*, Marsh *Tringa stagnatilis* and Wood *T. glareola* Sandpipers, , Greenshank *T. nebularia*, Black-winged Stilts *Himantopus himantopus*, Red-necked Avocets *Recurvirostra novaehollandiae*, Red-capped *Charadrius ruficapillus* and

Black-fronted Plovers *C. melanops* , Red-kneed Dotterels *Erythrogonys cinctus* and a Ruddy Turnstone *Arenaria interpres*. Observation was down to within 15 metres. The first impression was of an immaculate, lightly built small stint of neat and tidy appearance with brown upperparts and white below. The breast was lightly streaked, the legs were olive green and the bill was slightly decurved and dark in colour. The bird was creeping about on bent legs and running, mouse-like, into grass tussocks for cover when alarmed by accompanying Sharp-tailed Sandpipers. It showed a white chin and throat and obvious supercilium. Long-toed Stint was immediately suspected and it was later confirmed as an adult in non-breeding plumage after consulting Cramp & Simmons (1982) and Jonsson & Grant (1984).

The following day was again clear and cloudless but with a very strong cold east wind and gale force gusts which made watching very difficult. The Long-toed Stint was seen again at 08.00 (Eastern Australian Standard Time) when it was described in field notes as tiny and mouse-like with yellow green legs. When feeding its walk was described as "sneaking" and it had to lift its feet deliberately to walk in the soft mud on account of its long legs and toes. However it did run fast when alarmed by Sharp-tailed Sandpipers with which it was easy to compare its very small size. The usual method of feeding was by picking daintily from the surface of wet mud and water, but it did stick its bill into mud from time to time and once turned its head sideways to flick over a piece of debris with its bill. The supercilium was very long and the throat, chin and under parts were a bright, clean white with no streaks nor marks beyond the breast band. When it stretched its wings it showed its back and tail; a short, fine wing bar and uniform dark primaries were noted; the back and rump were dark with pale sides to the rump; the tail was dark and wedge shaped. There was no trace of chestnut on the upperparts and the distinct cap on the crown, made obvious by the long supercilium was marked with fine streaks.

Some small Sharp-tailed Sandpipers moulting from breeding to non-breeding plumage suggested Long-toed Stint at first sight. However the Long-toed Stint had no bars on flanks nor streaks on under-tail coverts. The short bill was also finer and the head was relatively smaller than those of Sharp-tailed Sandpipers. Generally the Long-toed Stint appeared neater and tidier than the accompanying Sharp-tailed Sandpipers. These occasionally "crept" about like the Long-toed Stint but generally prefered to probe rather than pick in the muddy conditions pertaining at the time. Also the supercilium of the Long-toed Stint was much clearer than those of the adult Sharp-tailed Sandpipers and more like that of juveniles. However, there was no trace of chestnut nor rufous tones in the plumage of this stint. In the presence of Sharp-tailed Sandpipers size is diagnostic, with the Long-toed Stint "tiny".

A Long-toed Stint, presumably the same bird, was seen again at Fivebough Swamp in the same general area on 9 and 23 November, 14 December 1985 and 26 January and

9 February 1986. No field notes were taken after 9 November when it was noted that scapulars had dark feather centres and broad pale fringes. This bird was not seen again despite continuing weekly visits to Fivebough Swamp.

The following year on 8 March 1987 a Long-toed Stint was again present at Fivebough Swamp. As a consequence of previous experience with this species, and Little Stint *Calidris minuta*, Temminck's Stint *C. temminckii* (in UK), Least Sandpiper and Semi-palmated Sandpiper *C. pusilla* (in Canada) it was not considered necessary to take detailed notes at the time. In retrospect this is now considered to have been a most unfortunate decision.

However, the bird was only 12 metres away and it was noted that the tertials had rufous edges and one scapular was rufous also. The call was described as a "liquid piping call". The bird was seen again on 15 and 22 March 1987, when it was feeding on mud at the edge of a patch of cumbungi *Typha sp.* On 29 March 1987, by which time it showed a marked cap with greyish neck and breeding plumage coverts, scapulars and tertials, the legs were described as pale yellow. On 5 April 1987 it was still present with two Wood Sandpipers and a Double-banded Plover *Charadrius bicinctus.* The only comment in my notes was "long tertials with broad chestnut edges". The last sighting was on 12 April 1987 when no further notes were taken.

It was several years later, with visits to Fivebough continued weekly, on 18 August 1991 before another Long-toed Stint was present at Fivebough. Initially it was resting, crouched on the edge of a small pool in water couch *Paspalum paspalodes* roughly cropped by grazing cattle. When it started to feed the yellow/green legs and slightly decurved fine two-tone bill were noted and the bird was tentatively identified as an adult Long-toed Stint in worn breeding plumage. This was confirmed later following reference to Cramp & Simmons (1982), Jonsson & Grant (1984), and Hayman *et al.*(1986).

On 24 November 1991 a Long-toed Stint, presumably the same bird seen on 18 August 1991, was again present. By this time I realised how scarce this species had been over ten years of weekly visits to Fivebough. Consequently, detailed notes were taken on 24 November, 9 and 14 December 1991. The following description is based on these field notes.

Conditions. All observations were in the morning between 06.30 and 09.00 (E.A.S.T.). The approach was from the SE and round to the W. Light was excellent. The bird was always in the same general area of very shallow water, slowly drying out, with dried mud heavily poached by cattle and interspersed with small tussocks of closely cropped water couch. Approach was down to 12 metres.

Size and shape. The presence of Sharp-tailed Sandpipers, Red-necked Stints and Red-capped Plovers feeding with the Long-toed Stint made relative size comparisons of great value and easy to estimate. The Long-toed Stint was clearly very much smaller than Sharp-tailed Sandpipers and noticeably smaller than both Red-necked Stints and Red-capped Plovers. The tertials extended to about the same length as the tail.

Upper parts. Generally brown relative to grey Red-necked Stints. Comparison was as marked as difference in colour between Sharp-tailed Sandpipers and Marsh Sandpipers. However, there was less contrast of back feathers than in Sharp-tailed Sandpipers. Centres of scapulars and coverts of Long-toed Stint were dark and broadly edged brownish grey. The head and bill were smaller and finer respectively than those of Red-necked Stints present. A clear supercilium, which was not noticeably bulbous in front of the eye (see Alstrom & Olsson, 1989) extended well past the eye. The forehead, crown and lores were dark and the ear coverts showed a dark smudge behind and below the eye.

Wings. A short fine wing bar was noted on stretched wings.

Under parts. Under parts were a clear, bright white with a light indistinct, greyish breastband.

Bare parts. Fine bill, less in length than width of the head. Obvious pale legs. Light base to lower mandible.

Behaviour. Slower, more deliberate feeder than Red-necked Stint. Less picking, a slower walk, kept crouching down. Creeping style of locomotion. Once flicked over debris. Hiding crouched in tussocks of water couch and dried cattle footprints when Swamp Harrier *Circus aeruginosus* overhead. Wary, stalking and crouching alternately. The walk of the Long-toed Stint when feeding is deliberate with bent legs; not the urgent, tiptoe runs of the hyperactive Red-necked Stint under the same conditions.

Voice. A sweet soft "crreeet" repeated when agitated several times from a crouched position half hidden in a dry cow foot print. When approached within 12 metres the Long-toed Stint flew: it towered high into the sky over the swamp repeating the same "crreeet" call. No other calls were heard.

STATUS IN NEW SOUTH WALES

The records of Long-toed Stints in New South Wales are summarised in Table 1. There have been 14 records from 1969 to 1991 at nine locations between 18 August and 12 April. Single birds were usually recorded with only one exception when two were seen at Cobar. All records except one have been away from the coast. Long-toed Stints are not

recorded every year in New South Wales and the increasing number of birdwatchers has not been reflected in any increase in records over recent years. These observations suggest that this species is an irregular summer visitor in small numbers to New South Wales.

Table 1 Summary of Reports of Long-toed Stints in New South Wales.

YEAR	DATE	LOCATION	REFERENCE
1969	6-15/1	Dareton	Morris *et al.* 1981
1975-76	23/11-7/2	Cobar*	*Aust. Birds* **11**:92
1977-78	29/10-18/3	Hawkesbury Marshes	*Aust. Birds* **13**:10, **14**:10
1979	11-22/11	Parkes	Morris *et al.* 1981
1981	28/12	Wentworth	*Aust. Birds* **17**:11
1982	13/11	Tullakool	*Aust. Birds* **18**:51
1983-84	26/12-20/2	Fletcher's Lake	*Aust. Birds* **19**:86, **20**:116
1985-86	26/10-9/2	Fivebough Swamp	*Aust. Birds* **22**:22, **23**:81
1986	1-2/11	Shell Point	*Aust. Birds* **23**:81
1987	18/12	Tullakool	*T B O* **672**:15
1987	1/2 8/3-12/4	Hawkesbury Marshes} Fivebough Swamp }	*Aust. Birds* **24**:58
1991	18/8-14/12	Fivebough Swamp	This report

*Refers to two birds, all others one only

DISCUSSION

At Fivebough over the ten year period 1982 to 1991 Long-toed Stints were present in three summers, and it is probable that only three birds were involved. Over that period 385 visits, of average duration two hours, were made to Fivebough to count waders; 308 of these visits were in the warmer months between 1 August and 30 April of the following year. Long-toed Stints were seen on 17 occasions over the three summers which represent less than 6 percent of visits when they could have reasonably been expected in New South Wales. These observations support the conclusion that Long-toed Stints are irregular visitors to New South Wales in small numbers in the non-breeding season.

Long-toed Stints are very quiet, unobtrusive and wary. Consequently, they are easily overlooked. The grassy edges of shallow pools, drying muddy edges of cumbungi stands and drying mud disturbed by cattle adjacent to muddy shallow pools are good places to search for a crouching bird which can be easily approached to about 12-15 metres. Once found the site can be revisited over an extended period with a very good chance of relocation as Long-toed Stints are apparently very loyal to a specific area in a particular site, provided conditions do not change markedly.

Once located the Long-toed Stint is not a difficult bird to identify, if it is assumed that Least Sandpipers do not occur in Australia. A combination of very small size, brownish upperparts, clear white supercilium and throat, pale yellow/green legs and lightly streaked indistinct breastband and otherwise bright, white underparts are sufficient identification parameters.

Reference to published literature (Jonsson & Grant, 1984; Hayman *et al.* 1986; Pizzey, 1980) suggests that Long-toed Stints habitually stretch to full height and this may help identification because of the longer neck relative to other small calidrids. This behaviour was never exhibited at Fivebough even in taller water couch tussocks. On the contrary, it was more usual to see Long-toed Stint crouched down in short cropped vegetation or half hidden in a cattle footprint.

Although the notes referred to in this paper, and the geographical location, strongly suggest Long-toed Stint and clearly eliminate Red-necked Stint, and other dark legged small calidrids even more detailed notes would be desirable to eliminate Least Sandpiper with 100% certainty if this species were to occur in Australia (see Jonsson & Grant, 1984; Alstrom & Olsson, 1989; Hayman *et al.* 1986).

Least Sandpiper is a Nearctic species which shares with Long-toed Stint the characteristics of small size, brown upperparts, pale olive or yellow/green legs and marked breastband. I cannot recall Least Sandpipers on migration in Canada moving about with the

relatively slow, deliberate, creeping movements characteristic of Long-toed Stints at Fivebough. This behavioural factor may be a useful aid in the separation of these two species where they occur together.

Transcriptions of calls are notoriously variable, particularly for stints (Jonsson & Grant, 1984). The 1991 Long-toed Stint at Fivebough called several times very clearly and the call, described as "crreeet", is comparable with "kree" (Lane, 1987), "chee" (Frith, 1976; Pringle, 1987; Pizzey, 1980) or "chree" (Jonsson & Grant, 1984). However, the description of calls for Least Sandpiper in Jonsson & Grant (1984) "trree", Hayman et al. (1986) "trree", Cramp & Simmons (1983) "kreeep", and Pratt et al (1987) "stree-eep" suggest a similar call for this species. Field guides from North America where Least Sandpiper is very common would support this call for Least Sandpiper (Robbins et al. 1966; Scott, 1983), whereas field guides from SE Asia (King et al. 1975), Thailand (Lekagul & Round, 1991), Japan (Wild Birds Society of Japan, 1982) and Australia (Slater et al. 1989; Simpson & Day, 1986) do not mention any call for Long-toed Stint similar to the call of the Fivebough bird. Obviously great care needs to be exhibited where the call is used for identification purposes for these two very similar species. Having brought attention to this matter the combination of obvious very long supercilium, short fine wing bar and uniform dark primaries strongly support Long-toed Stint rather than Least Sandpiper for the first Fivebough bird; marked cap with greyish neck, long tertials with broad chestnut edges and two-tone bill strongly support Long-toed Stint for second bird; and fine short wing bar, light indistinct greyish breastband, light base to lower mandible, dark lores and forehead, clear supercilium and towering flight strongly support Long-toed Stint for the third bird. It is therefore highly unlikely that any of these would have been a Least Sandpiper.

As a consequence of the observations, anomalies and uncertainties discussed in the preceding notes, it is recommended that detailed descriptions and field notes, including calls, of all pale legged stints seen in Australia should be made by enthusiastic observers. Colour photographs from various angles would be invaluable for subsequent perusal by interested groups, individuals or record appraisal committees.

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ADULT BARRED CUCKOO-SHRIKE FEEDS CICADAS TO JUVENILE

D. SECOMB

On the 13 January 1990, a Barred Cuckoo-shrike *Coracina lineata*, was observed feeding cicadas to an advanced juvenile at Gumma Crossing 5.5 km east of Macksville. The two birds were observed in a small cluster of rainforest species including Native Celtis *Celtis paniculata*, Red Olive Plum *Cassine australis*, Port Jackson fig *Ficus rubiginosa*, Blue Lilly-pilly *Syzygium oleosum* and Ribbonwood *Euroschinus falcata*. The later three trees were fruiting, attracting a number of Figbirds *Sphecotheres viridus*, Olive-backed Oriole *Oriolus sagittatus* and a Lewin's Honeyeater *Meliphaga lewinii*. The cluster of rainforest species contrast with the surrounding vegetation, consisting of areas of Swamp Oak *Allocasuarina glauca*, Grey Mangrove *Avicennia marina var. australasica* and Sea Rush *Juncus kraussi*, Blackbutt *Eucalyptus pilularis* forest with a heath-like understorey and a picnic area which is well grassed and with scattered trees predominately Swamp Oak.

During the observation two features drew my attention. Firstly, the juvenile was being fed on medium black cicadas, species unknown, but possibly Black Prince *Psaltoda plaga* (A.B. Rose *in litt.* 1992) found in the Swamp Oaks and once fed a large yellow/red fruit, species unknown. Observations at Nambucca Heads on the 1 February 1986 and the 16 March 1986 (Clancy 1989) and pers. obs.; and Repton area on the 12 January 1991 and January and February 1992; young Barred Cuckoo-shrikes were being fed solely on Small-leaved fig *Ficus obliqua* and Port Jackson Fig. Clancy (1990) noted nestling and juvenile Cuckoo-shrikes were fed fruit and insects at Port Macquarie.

The second interesting feature was the method of capturing the cicadas. E.S. Hoskin points out that in his experience, while cicadas seem easy prey, many birds find cicadas elusive to catch. This was born out by my observation. The adult would land on a branch, flushing a cluster of cicadas. In the pursuit that followed, it was clear the agility necessary to catch cicadas in flight was lacking and several flush/pursuit events were required before a successful catch was made. Considering there were fruiting trees at the picnic area (the adult fed on the fruit of Port Jackson Fig and Ribbonwood) and suitable fig trees in the surrounding district, it is not clear as to why the adult engaged in an apparently energy consuming chase for cicadas. However Hoskin *(in litt.* 23 February 1992) makes the point that many species of birds eat cicadas and all fruitivorous species give protein to their young, so that it is not anything unusual but probably has not been documented before for this species.

The juvenile amongst other plumage features, was mottled grey on the head, neck and breast, the belly was white, while wing coverts had dark centres with buff edging. Casual observation of a juvenile in the Repton/Mylestom area (just north of Urunga) in January and

February 1992, suggest that the grey mottling is lost approximately four to five weeks out of the nest. The young bird at Gumma Crossing was confident when flying, often following the adult. Considering its age and mobility, the nesting site may not only include the Nambucca Valley as suggested by Morris *et al.* (1990). Barred Cuckoo-shrikes, including immatures, have been seen at locations in the neighbouring valleys of the Bellinger and Macleay (20 to 25 km from Gumma Crossing). The possibility of the young bird moving from these neighbouring areas cannot be discounted.

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THE COTTON PYGMY-GOOSE IN NEW SOUTH WALES

IAN A.W. McALLAN

The Cotton Pygmy-Goose *Nettapus coromandelianus* is known to have decreased in range and abundance in Eastern Australia since the arrival of Europeans and now only appears to persist in any numbers in Queensland (Blakers *et al* 1984, Marchant & Higgins 1990). Following a sighting of a female Cotton Pygmy-Goose at Lane Cove, I have been prompted to locate all reports of this species for New South Wales. This paper summarises these records and comments on possible reasons for the current status of the species in N.S.W.

Set out below are details of some early collector's cabinets that relate to early records of the Cotton Pygmy-Goose in N.S.W. together with records of all other reports.

The Dixon and Strathallan cabinets, Hunter Valley c.1820

In 1937 Sir William Dixon purchased a collector's cabinet in London for the State Library N.S.W. (Imashev 1991). Painted on one of the interior panels of the cabinet is a picture of a male Cotton Pygmy-Goose in flight with another unidentifiable duck on a stretch of water nearby (pers. obs.).

In 1989 a private collector purchased another collector's cabinet from Sotherby's in Melbourne. This cabinet is known as the Strathallan Cabinet from the castle in Scotland where it originated. The paintings in the cabinet are almost identical, though the other duck on the relevant panel is undoubtedly an Australasian Shoveler *Anas rhynchotis*. In addition most of the original bird specimens are intact (McCormick 1991). Included amongst these 80 specimens is a study skin of a male Cotton Pygmy-Goose. There is the possibility that as there was more than one collector's cabinet there may have originally been more than one Cotton Pygmy-Goose collected.

The origins of these cabinets are obscure, however, the Strathallan Cabinet may have been owned by Governor Lachlan Macquarie. Macquarie was a close friend of James Drummond whose family owned Strathallan Castle up until 1910.

Amongst the painted panels are three views of Newcastle, that, through the buildings pictured, can be dated to between August 1818 and around 1820 (Imashev 1991, McCormick 1991). Some of the other panels, including the Cotton Pygmy-Goose panel, show scenes that can be identified with the lower Hunter area. The view in the pygmy-goose panel appears to be that looking south down the Hunter towards Black Hill and Mt. Sugarloaf (pers. obs.), possibly from near Raymond Terrace. The Hunter River is tidal in this area and the panel on the Dixon Cabinet shows the banks exposed much as at low tide.

Despite the suggestion that all the specimens came from the Newcastle area some undoubtedly did not. One of the painted panels found on both cabinets depicts a Galah *Cacatua roseicapilla* and a Crested Pigeon *Ocyphaps lophotes* with a background that is apparently also from the Newcastle area near Lake Macquarie (McCormick 1991). This is undoubtedly manufactured. Galahs did not reach the Hunter Valley until around 1919-1920 (Bourke 1969) while John Gould thought that Crested Pigeons were only occasionally seen on the Liverpool Plains 200 km to the northwest some 20 years after the panels were painted (Gould 1865). These two birds were probably specimens collected on one of John Oxley's expeditions, either to the Lachlan River in 1817 or the lower Macquarie River in 1818.

There is an outside possibility that Oxley may have collected Cotton Pygmy-Geese somewhere between the Hastings and Hunter Rivers in 1818, otherwise none of the presently known range of the Cotton Pygmy-Goose in Australia had been intensively explored before 1824. Given all this evidence at least one male Cotton Pygmy-Goose was collected somewhere south of the Hastings River and most probably in the lower Hunter area around 1818-1820.

John Gould's correspondents, Hunter River, before 1842

John Gould (1842) wrote that the Cotton Pygmy-Goose inhabits, "the estuaries and rivers between the ranges, and the coast from the Hunter to Moreton Bay". Gould had not seen the bird alive.

He did not state who his informants were, though two possibilities are Alexander W. Scott whom Gould visited on the lower Hunter in 1839 (see Gould 1865 Vol.1: 38) and Frederick Strange who supplied Gould with much information concerning the birds of the north coast of N.S.W. and the Moreton Bay district (Whittell 1947). Alternatively Gould, or his informant, could have known of the collector's cabinets.

John Macgillivray, South Grafton, October 1864

North (1889) noted that the Cotton Pygmy-Goose was, "rather abundant on the Richmond and Clarence Rivers" and described, "an egg taken from the oviduct of a bird of this species shot by Mr. J. Macgillivray at South Grafton, during October 1864". He gave no further information in his revised edition of this work.

Two specimens Australian Museum, Grafton, before July 1881

There are two skins, A10357 (a male) and A10358 (a female) of Cotton Pygmy-Goose that were registered in the Australian Museum in July 1881 (W.E. Boles pers. comm.). These specimens were purchased at the Sydney Markets for one shilling and

sixpence and apparently originated from Grafton.

James C. Wilcox, South Grafton, 1882

Campbell (1900) wrote, "Mr. James Wilcox, of the same district, has kindly sent me the following note: "One of the birds had its nest in the spout of a gum-tree, about seventy feet from the ground, in my garden in South Grafton, and, from what I remember, there were seven or eight young ones, which she carried out in her bill after they were hatched. The spout almost overhangs a small creek. ..... I know of other nests in trees about our swamps. "."

Jackson (1907) gave the date of this clutch as 1882.

J.C. Wilcox, Grafton district, 23 November, 1891

In the Australian Museum there is an egg collected by J.C. Wilcox on 23 November 1891. The locality is again Grafton and the bird was registered as 0.25990 in 1917 (W.E. Boles, pers. comm.).

S.W. Jackson, Clarence River, August, 1895

Jackson (1907) wrote, "I possess a fine pair of these birds (male and female), which were shot on a Clarence River swamp during 1895". These specimens are in the H.L. White collection in the Museum of Victoria and were apparently collected in August 1895 (Jones 1946).

Specimen Australian Museum, probably Lismore, before May 1924

A female specimen 0.27880 in the Australian Museum was collected by "Dr. A.M. Aspinall from Lismore" suggesting that the bird came from the Lismore area. It was registered into the Australian Museum collection in May 1924.

Duck hunters, Tuckean Swamp, Richmond River, 1955

Frith (1982) noted that a pair of Cotton Pygmy-Geese had been shot in Tuckean Swamp by duck hunters in 1955.

Duck Hunter, Tucki, Richmond River, 1956

Frith (1982) noted that a bird was shot by a duck hunter at Tucki in 1956. In both these instances Frith himself had identified the birds.

Peter Mackey and Peter Moore, near Murwillumbah, 23 May 1964

Peter Mackey wrote to Keith Hindwood in 1964 telling him that while in the company of Peter Moore he had seen two Cotton Pygmy-Geese on 23 May 1964. The locality was a lagoon near Murwillumbah covered with white-flowering water-lilies (E. Hoskin pers. comm.).

Fred Johnston, Arnold McGill and Ern Hoskin, Long-neck Lagoon and Wilberforce Swamp, June-September 1969

On 16 June 1969 Fred Johnston and Arnold McGill found a male Cotton Pygmy-Goose at Long-neck Lagoon near Cattai. The following weekend Ern Hoskin saw it at the same locality. On 12 July, Hoskin found that the bird had moved across the Hawkesbury River to a small swamp to the east of Wilberforce. It remained at this locality until last seen on 6 September 1969 (E. Hoskin pers. comm.).

Merle Baldwin, Rocky Dam, south east of Yetman, 1 August, 1971

On 1 August 1971 Merle Baldwin observed two females and a male Cotton Pygmy-Goose at Rocky Dam 35 km south east of Yetman feeding amongst "reeds" (Baldwin 1971).

The Lane Cove Record, late November 1991 - February 1992

In the last week of November 1991 Hugo Floriani and Kim Baker, independently observed a duck they did not recognise. This duck was feeding in the lower channel of Stringybark Creek and the dam beside the S.C. Johnston factory at Lane Cove.

On 6 December after being informed by Floriani that there was a pygmy-goose at the factory, Joan McGregor and I visited the site. The bird was first seen flying down Stringybark Creek from the large weir beside the factory and landed on the creek channel where it commenced feeding on algae and waterweeds.

The channel at this point is separated from the main tidal inlet of the Lane Cove River by a smaller weir. Nonetheless the channel had some Grey Mangrove *Avicennia marina* and Samphire *Sarcocornia quinquiflora* growing in it suggesting that it is at least occasionally tidal.

The bird was observed at a distance of between 3 and 20 metres for about 45

minutes. It appeared as follows:

Size: slightly larger than the Australian Magpie-larks *Grallina cyanoleuca* on the bank of the channel nearby and slightly smaller than the Dusky Moorhens *Gallinula tenebrosa* further along the channel.

Facies: that of a pygmy-goose, that is, a small duck low in the water with small head and short neck (I have previously seen both Australian species of *Nettapus* a number of times in Queensland).

Plumage:

Head: very dark brown forehead and crown continuing in a very thin line down the nape to the back, brown stripe from base of upper mandible through the eye to the ear coverts. Remainder of head and neck white.
Wings and back: dark brown with a greenish gloss.
Uppertail coverts: lighter brown than back.
Tail: dark brown, though not as dark as the back and wings.
Lower neck and upper breast: white with very fine black tips to the feathers making very fine dark lines across the breast.
Belly and undertail coverts: white with some buff feathers.
Flanks: buff feathers which were fluffed up partly covering the wings through most of the observation.
Soft Part Colours:

Feet: lead grey.
Eyes: dark.
Bill: dark grey with a hint of yellow on the base of the lower mandible.

Floriani and Baker joined us as we were watching the Pygmy-Goose and the bird then flew back upstream towards the larger weir. The bird again came back down to the channel allowing us to see the wing pattern from above. This pattern was completely dark brown apart from a thin trailing edge of white on the secondaries which became slightly wider towards the body.

After examination of a number of field-guides (Pizzey & Doyle 1981; Slater *et al*, 1986; Simpson *et al*, 1986 and Marchant & Higgins, 1990) we were able to determine that the bird was an adult female Cotton Pygmy-Goose.

Floriani and Baker had also observed the bird feeding on a number of occasions on the reservoir behind the upper weir. This weir had a large cover of introduced water lilies

Nymphaea sp. and water hyacinth *Eichhornia crassipes*. Other species of waterfowl on the reservoir included Chestnut Teal *Anas castanea*, Pacific Black Duck *Anas superciliosa*, Mallard *Anas platyrhynchos*, Dusky Moorhen and various other introduced ducks.

The Cotton Pygmy-Goose stayed in the area at least into the following week but had gone by 13 December (H. Floriani pers. comm.). There was a report of the bird from further up the Lane Cove River the following week by a volunteer at the Australian Museum (W.E. Boles pers. comm.). The bird was seen again at Lane Cove State Recreation Area on 8 February 1992 (A. Burton pers. comm.). I am not aware of any later sightings.

I have not been able to find any recent reports of pygmy-geese kept by New South Wales aviculturalists. This bird was probably a wild bird, possibly present as a consequence of a severe drought in eastern Queensland and northern New South Wales the previous few months.

DISCUSSION

The Cotton Pygmy-Goose was a breeding bird in the Clarence and Richmond River districts up until the 1930s. From the evidence of the collector's cabinets and Gould's correspondents there is little doubt that they occurred as far south as the Hunter River where there was, and still is, a large wetland system. They have occurred as vagrants as far south as Victoria (Emison *et al*, 1987). Indeed, given the paucity of recent records, this species must also now be considered a vagrant to New South Wales.

The decline of the Cotton Pygmy-Goose in New South Wales can be put down to two possible causes: hunting and habitat loss. The majority of the documented records of the species for the state refer to collection for food or study purposes. Continued shooting to supply both the needs of collectors and the apparent demand of the Sydney Market can only have had a deleterious effect.

Beruldsen (1977) suggested that the reason for their decline in the Clarence Valley was a consequence of draining of wetlands for flood control and the spread of water hyacinth over much of the free-standing water in the area. While this has happened on some wetlands in the area it has not occurred on all. For example the South Grafton Swamp has been drained though the Ulmarra and Everlasting Swamps still regularly hold water (D. Geering pers. comm.). Similarly, while water hyacinth is found on many wetlands in the area it is widespread in eastern Queensland throughout most of the remaining range of the Cotton Pygmy-Goose in Australia.

Although severely reduced in area, large wetlands are still present in the Richmond, Clarence and Hunter Valleys (for example Tuckean, Ulmarra and Hexham Swamps). The

most likely change in these wetlands however, is the availability of nest hollows. Cotton Pygmy-Geese breed in hollows of trees in or near deep swamps (Beruldsen 1977). While many near-coastal wetlands persist, the areas surrounding them have been greatly modified for agriculture. Large areas have been clear-felled on the coastal floodplains and often within the wetlands themselves, for example Ulmarra Swamp (D. Geering pers. comm.).

Additionally some drainage works have ensured the survival of the waterbody but have interferred with the water levels, which may mean that trees standing in the water die. This may be occurring, for example, at the Tuckean Swamp and in parts of the Hunter (M. Stanton & D. Russell pers. comm.).

If there was a breeding population of Cotton Pygmy-Geese in the Hunter Valley then it presumably had been severely reduced before Gould visited the area in 1839. As there had been little draining of wetlands by this date any such decline would have probably been due to shooting of birds or clearing of the surrounding forest.

The panels of the collector's cabinets show the Pygmy-Goose on a tidal stretch of the Hunter River while the bird at Stringybark Creek was also feeding in an area that was occasionally tidal. Consequently Gould (1842) may have been correct and Cotton Pygmy-Geese in the southern parts of their range may feed in estuaries and rivers (*contra* Frith 1982).

The Cotton Pygmy-Goose has been protected in New South Wales since 1948 under the provisions of the Fauna Protection Act 1948. Since that time, numbers in central Queensland have remained relatively stable and may have actually increased (Blakers *et al*, 1984). It may be that the only barriers to the Cotton Pygmy-Goose reoccupying the coastal wetlands of New South Wales are the low overall numbers of the species from which recruitment might come and the degraded conditions of these wetlands and immediately surrounding forests.

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OBITUARY - ELLIS McNAMARA

Ellis was born on the Cordeaux River on the 23 September 1915 and died at Bulli Hospital on the 7 January 1992. He was the third generation to tend the apple orchard at Cordeaux River which had been established by his Grandfather and which had apparently been unprofitable until Ellis took it over. By a judicious selection of trees he was able to increase the yield of the orchard to the stage where it became more than viable. However this was a long-term project and it was not until the early 1950's that Ellis was able to take up his pursuit of bird photography.

Ellis had had a great interest in birds right from the age of 10 and in fact had sketched birds while he was in primary school. There was a patch of rain forest on the property and the house was within 50 metres of the edge and together with the open eucalypt forest around the orchard there was habitat for a wide variety of birds. The orchard therefore became somewhat of a mecca for birdwatchers and regular visitors there included Keith Hindwood, Norman Chaffer, Roy Cooper, Arnold McGill, Jack Waterhouse and some overseas ornithologists who were taken down there from time to time.

Ellis joined the R.A.O.U. in 1935 and was still shown as a member when the last membership list was published in Volume 70. He published 3 papers and 6 short stories in the *Emu* between Volumes 34 and 46. His mentor in coloured bird photography was Norman Chaffer and he did a trip to North Queensland in 1954 with Norman Chaffer and in 1957 through the Mallee with Jack Waterhouse. He did many subsequent trips on his own to isolated areas where he photographed birds some of which had not yet been seen by most birdwatchers. An example of this was the Grey Grasswren. Ellis told us how it had taken him three days to locate the nest and then he had to wait another couple of days for the bird to come back to it after it had set up the hide. Of great assistance to Ellis in his photography was his experience as a young birdwatcher and his ability to locate nests. In one year he located in the Barren Ground so many nesting Bristle Birds that the then guardian of fauna Mr. Griffiths was astonished to find that there were that number in the reserve.

For many years Ellis came to the meetings at the Museum to show members his slides. These visits usually were to the January or February meetings and even though the January meetings were at that stage poorly attended because of absences on school holidays, the theatre was always crowded with people sitting on the steps. During my period in the chair Ellis was in poor health and he often came to show his slides when he no doubt felt the strain of a trip to Sydney.

It was only when his health became so bad that he ceased to attend and he was missed very much by those of us who were used to seeing his slides each year.

Ellis was a perfectionist and was always seeking to improve on the slides he had

taken, most of which would have been a source of great pride to anybody else who had created them. Of all the slides that Ellis had shown that which I can always envisage is that of the White Goshawk with its prey of a Crimson Rosella in an apple tree in the orchard. This slide has been reproduced in a number of publications. Ellis had never married. Our sympathy goes out to all those members of the McNamara family and particularly to his cousins, Flo and Jack, who have been most helpful in giving us the information to enable the biographical section of this appreciation.

J. Francis

NOTICE TO CONTRIBUTORS

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

1. Species, names, and the order in which they occur are to be in accordance with "The Handbook of Australian, New Zealand and Antarctic Birds". S. Marchant & P. Higgins (Eds.) Volumes 1 & 2; and "Handlist of Birds in New South Wales". A.K. Morris, A.R. McGill and G. Holmes 1981 Dubbo: NSWFOC.

2. Articles or notes should be type written and submitted in quadruplicate. Double spacing is required.

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

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

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

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

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

8. Dates must be written "1 January 1990" except in tables and figures where they may be abbreviated.

9. The 24 hour clock will be used, times being written 06:30, 18:30 for 6:30am and 6:30pm respectively

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

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

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

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

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