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THE ECOLOGY OF THE STRAW-NECKED IBIS IN WINTER AT TOOWOOMBA, SOUTH-EAST QUEENSLAND

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SUMMARY

Straw-necked Ibis roosting sites, daily activity pattern and feeding habitat preferences are described. They roost in tall living eucalyptus from about 15 m upwards. The roosting site is generally the wood closest to the dusk drinking site which can accommodate the whole flock. In cold, windy weather they use more distant woods which apparently provide more sheltered perches. More than 75% of their day was spent feeding. The next most frequent activity, preening, mainly occurred during the middle of the day and at dusk and dawn. Most drank at dusk. They fed on pastures ranging from dry to wet, but showed a distinct preference for those of average moisture content. Few fed in water or on croplands.

INTRODUCTION

This study of the Straw-necked Ibis *Threskiornis spinicollis* was made as a preliminary to a wider study of the species breeding and movements in Australia (McKilligan 1975a). The Straw-necked Ibis uses south-eastern Queensland as a dry season refuge when conditions become unfavourable nearer its breeding swamps in inland south-eastern Australia. Such refuges seem to play a vital role in maintaining the population numbers of the species. It is therefore of interest to know how the species exploits the resources available to it in one such refuge area, Toowoomba, and how man's activities there affect it. Carrick (1959) studied the food and feeding habits of the Straw-necked Ibis in the vicinity of its breeding swamps.

This paper describes the roosting sites of ibises, daily behaviour pattern and time activity budget and their use of different feeding habitats in the area.

STUDY AREA AND METHODS

Toowoomba (27°34'S,151°57'E) lies on top of the Great Dividing Range at 609 m above sea level. The study area (Figure 1)

extended over about 14,400 ha westwards from the edge of the steep eastern escarpment of the Range. These undulating western slopes were once thickly wooded and had a 60 ha swamp, but today almost half the area is urbanized, and most of the remainder cleared for pasture and cultivation. Only small portions of the original woodlands and a few hectares of swamp remain. Mean annual rainfall is 95 cm, most of this falling in summer. Winter mean maximum and minimum temperatures are 19.2°C and 7.2°C respectively. Typically 300-400 Straw-necked Ibises spend from autumn to early spring at Toowoomba. Resident flocks are much less common in spring and summer. In dry years they arrive earlier, leave later and occur in larger numbers than in years of higher rainfall. In 1974 there were exceptionally good rains inland and the species was virtually absent from Toowoomba.

The study was conducted during periods of ibis presence at Toowoomba in 1969, 1970 and 1971. Each year their roosting and drinking sites were located and the numbers in roosting flocks counted. These counts were made 2-3 times per week at one important roost (R_1) but less frequently at the others. Measurements of selected roosting trees were made.

Daytime activity and feeding habitat preference of the ibis was sampled in three ways: from observations made along a 7½ km transect across the southern side of the study area (Figure 1); by continuous dawn to dusk observations of a single flock of ibises on major feeding grounds during which each bird's activity was recorded at five minute intervals; and from observations made opportunistically while I travelled in the study area and prepared to count roosting flocks. All data were recorded in a standardized way on data sheets.

Weather data came from the Commonwealth Bureau of Meteorology recording station at Toowoomba.

RESULTS

Roosting

Figure 1 shows the location of the 15 roosting sites and all woodlands of area greater than one hectare. There were four preferred roosting sites (R_1, R_2, R_4 and R_7). These four were occupied for long periods by large numbers of ibises in each of the three years of the study, whereas the remainder (denoted 'r') were used only occasionally. The trees chosen for roosting were tall (21m), living eucalypts that provided fairly level, easily accessible perches of 4 to 12 cm thick at 15 m or more above ground level.

The four main roosts were each close (9 to 136 m) to an earth dam or creek where the ibises assembled and drank in the late afternoon.

The two largest roosts, R_1 and R_4, were near the most intensively used feeding grounds; low ground adjacent to a lagoon and creek in the case of R_1, and paddocks irrigated with water carrying abattoir wastes near R_4. Minor roosting sites and woods not used for roosting were either further from a drinking site than the main sites or contained few suitable trees.

Figure 1 also shows the longest distances travelled from the main

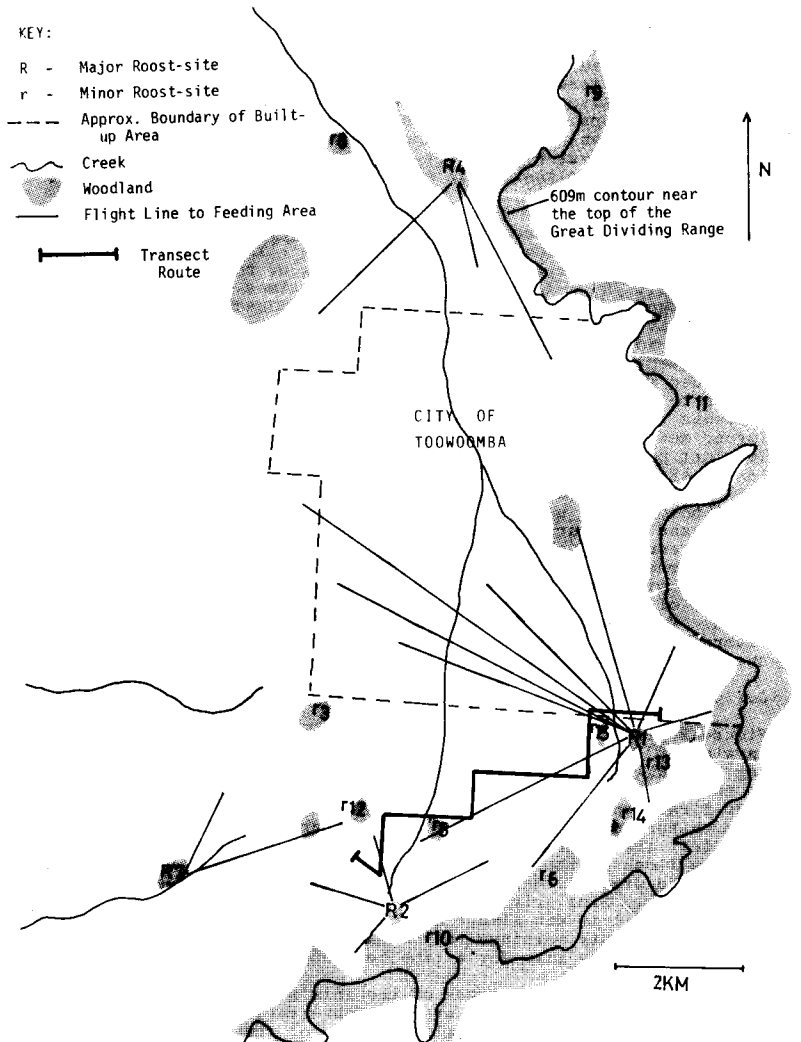

FIGURE 1. Map of the study area showing roost-sites and flight routes from roosts to feeding areas

roosts to feeding grounds in different directions. From limited data, it seems the ibises used the feeding grounds closest to their roosting site and there was little overlap in the feeding ranges of ibises from different sites. As a rule, all ibises which shared a dusk drinking site roosted together. This excluded large flocks from small groups of trees. This preference for roosting together was clearly shown on two occasions when new arrivals increased roosting numbers at R_1 by about 50% and, after several unsuccessful attempts to settle there, the entire flock moved to a larger wood nearby.

Each winter the main roosts R_1, R_2 and R_4 were abandoned for varying periods in favour of nearby roosting sites. Thus the ibises from R_1 went to r_{13} or r_{14}, those from R_4 to r_8 or r_9 and from R_2 to r_5 or, probably, R_7. At R_1 this happened 24 times in the three years of the study. Except for the two aforementioned occasions these shifts away from the usual sites were not because of increased numbers. Nor were they caused by the ibises changing their drinking or feeding locations, nor by human disturbance. The change coincided with the onset of strong south-westerly winds and the return to the main roost took place after these winds had subsided. Students t test shows a significant difference between mean wind force, measured at 1800 hours, on days when R_1 was used (2.21 Beaufort points) and when R_1 was abandoned (3.68 Beaufort points) (t = 4.49, 76 d.f., P 0.001). Mean day maximum temperatures were not significantly different for days of using R_1 (17.7°C) compared with those of not using it (17°C). Wind strengths of 4 Beaufort points and more during warmer months (mean day maximum = 22.7°C) did not cause any shift in the roosting site used by the ibises. The alternative sites all seemed to be more sheltered from the westerly wind than the usual ones, either because of the topography of the surrounding land and/or by being within larger woods. Measurements of perch microclimate at dusk in R_1 and its alternative r_{13} indicated that perches at the latter were more sheltered from the wind (McKilligan 1975b).

Daily Behaviour Pattern and Time Activity Budget

Figure 2 illustrates the main events in the ibis's day at Toowoomba in winter. They generally went directly from the roost to the feeding grounds around sunrise, spent the whole day there and returned to the vicinity of the roosting site around sunset. On their return, many first went to the drinking site before continuing to the roost. This pattern was influenced by the weather. On cold, windy mornings they left the roost at first light, earlier than usual, and formed a dense flock on the lowest ground near the drinking site. They rested and preened there for 30-60 minutes before going to the feeding grounds. Similarly in the late afternoon they gathered in this low area until it was almost dark when they flew *en masse* to the roost. On frosty mornings they sunned themselves in dead trees near the roosting site for a time before going to feed.

Table 1 gives the percentages of the ibis's day spent on different activities. Data from 1970 are from observations of 2205 ibises made from June to September at all times of the day along the transect and elsewhere in the study area. Data from 1971 are from one day of continuous dawn to dusk observation of a flock of about five ibises on their main feeding and drinking area near roosting site R_1 in June. The composition of this flock remained fairly constant

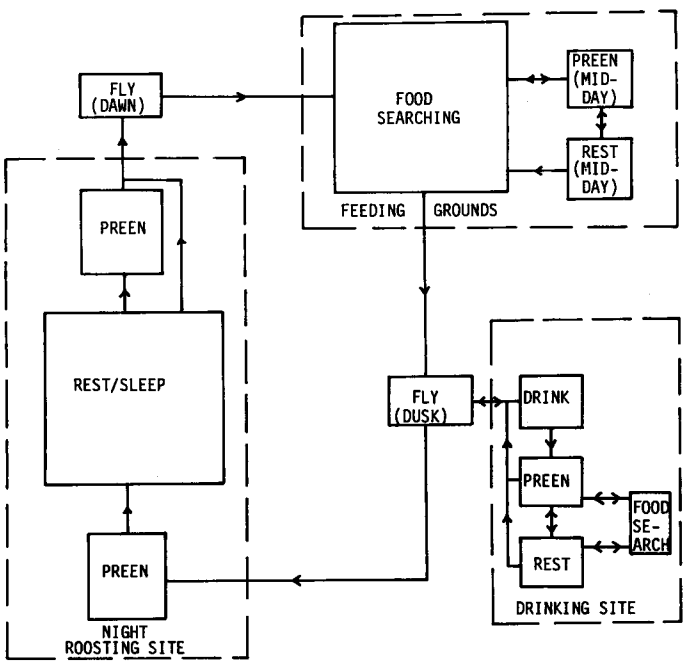

FIGURE 2. Flow diagram of the major events in the ibis's daily routine at Toowoomba (less common activities such as mid-day drinking and bathing are not shown).

until late afternoon when pre-roosting congregation brought the number under observation to about twelve. These data do not include the birds' activities in the roosting site nor the morning flight from roost to feeding grounds.

TABLE 1

Time activity budget of ibises in winter at Toowoomba from transect data and other observations in the study area in 1970 and from one day of continuous observation at a major feeding and drinking area in 1971.

YEAR	% ACTIVITY FREQUENCY						
	Food Search	Preen	Rest	Alert	Fly	Drink	Aggression
1970	75.2	6.8	4.3	3.0	8.6	1.8	0.3
1971	76.1	6.6	2.0	9.3	4.4	1.2	9.3

Data were very similar for the two years despite the different observation methods used. Most of the day was spent feeding. Three other days of continuous observation of larger flocks (25-64 birds) in 1971 produced feeding frequencies from 86.2-94.6%. But these may be artificially high as there were no opportunities for the ibises to drink on the feeding grounds surveyed and their activities near the roosting site very early and late in the day were not observed. In the 1970 data the proportion of ibises feeding reduced to almost 50% between 1200-1400 hours. This variation is significant at the 0.1% level (χ^2 = 46.22, 9 d.f.). In 1971 a similar 'middle of the day' reduction in feeding frequency occurred but was only significant in two of the four days of observation. In the middle of the day the frequencies of preening, resting and, in 1970, flying, increased. Many ibises also preened at the roost after awakening and before sleeping and at the drinking site in the late afternoon. Most drinking occurred near the roosting site before the ibises went to their roost. None were seen drinking in the early morning. Aggression was seldom seen between ibises feeding in a dispersed flock. By contrast, fights were frequent when they were competing for access to piles of waste foods put out for cattle, and for roosting perches at dusk. In the winters of both 1970 and 1971 rainfall was much below average, although higher than in many more inland areas which then suffered drought conditions.

Pattern of Use of Feeding Habitat

Ibises were seen feeding on grasslands, including city parks and road verges, in a swamp, on cultivated land after a vegetable crop had been pulled and on waste human foods put out for cattle. They were neven seen feeding in long, dense grass or in woodland with thick undergrowth. Prey were taken from the surface and by probing. No food analysis was undertaken but they were seen taking spiders, mice and a rat. Carrick (1959) showed their diet to comprise a wide diversity of small animals.

A transect sampled a representative section of the southern half of the study area. It was traversed 51 times from June to September in 1970 at all times of day. Table 2 gives the percentage of ibises feeding in each habitat type; the percentage area of each habitat

in relation to the total area surveyed; and the selection coefficient (Nikolsky 1963) for each habitat. The latter is a measure of the ibises' preference for the habitat. Pastures along the transect were classified as 'wet', 'average', or 'dry' referring to supposed differences in their soil moisture content. Wet pastures were wet underfoot and had some sedge and average pastures were not usually wet underfoot but were low-lying near a creek, a swamp, or were irrigated.

TABLE 2

The percentage of feeding ibises per habitat; the percentage of the habitat's area in relation to the total area surveyed; and the selection coefficient (% ibis/% habitat area).

	FEEDING HABITAT					
	Aquatic (shallows only)	Wet pasture	Average pasture	Dry pasture	Cultivated	Total ibis
% of Ibises	0.42	2.24	33.1	64.2	0	489
% Habitat area	0.8	1.08	5.8	80.5	11.8	Total habitat area (ha) 51.75
Selection coefficient	0.5	2.1	5.7	0.8	0	

80.5% of the area surveyed was dry pasture and 64.2% of the ibis were seen feeding there. Their densities were much higher on the smaller areas of wet and average pasture, however, as indicated by the selection coefficient. A selection coefficient of greater than 1 indicates a preference for a habitat, and one of less than 1 an avoidance of it. Obviously wet and especially average pastures were most preferred. By contrast the Sacred Ibis *Threskiornis molucca*, which occasionally visits Toowoomba, mostly feeds in wet and aquatic areas (McKilligan unpublished).

There were no aquatic or wet areas in the northern part of the study area. Judged from two days of continuous observation there and 30 shorter visits, the ibises from northern roosts fed on the abbattoir paddocks almost exclusively during weekdays, but divided their time between these and dry pastures in the area at weekends. The abattoir paddocks were irrigated on weekdays only. It is uncertain what proportion of the food of birds attending the irrigators was invertebrates flushed from the ground and how much was meat scraps.

DISCUSSION

The ibises used the same main roosting sites each year of the study, and also for one site at least, in the following seven years. The trees used obviously had to meet certain mechanical requirements for safe, comfortable perching. The roosting site

was close to the most intensively used feeding grounds. But the location of their dusk drinking site seemed the factor which determined which of a number of apparently suitable alternative groups of trees (within their feeding area) was used for roosting. They used the closest trees to this site which could accommodate the whole flock.

The ibises changed their roosting behaviour at times in winter, apparently to avoid unnecessary exposure to cold, westerly winds. This involved temporarily using a roost site which was more sheltered than the usual one, and roosting on sheltered ground at dusk and dawn at times when they would normally have been in the roosting trees. Presumably they roosted on the ground at dusk for as long as, and at dawn as soon as, there was enough light for them to safely do so.

Ibises at Toowoomba in winter spent more than 75% of daylight hours feeding. There was a slight but significant reduction in feeding frequency around midday. By contrast, at Julia Creek in northern Queensland in the winter of 1970 the ibis seems to spend much less time feeding. They habitually left their feeding grounds to roost at a nearby lake from about 1000 to 1430 hours each day (J. Bell pers. comm.). There were extensive flood waters at Julia Creek then and food may have been plentiful. The mean winter maximum temperature there is about 10°C higher than at Toowoomba. The large amount of time spent feeding at Toowoomba seems most likely to have been owing to a scarcity of food resulting from the very dry conditions. Relatively low temperatures at Toowoomba may also have had an influence either directly by increasing the birds' food requirements, or indirectly by restraining the growth of prey populations.

The Straw-necked Ibis's strong preference for feeding on average moisture content pasture at Toowoomba corresponds with Carrick's findings on the species in inland south-eastern Australia, where 75.2% of their food came from average pasture. The total contribution of different feeding habitats to ibis food in winter at Toowoomba can be roughly estimated by extrapolating from the present data. This assumes a direct relationship between the proportion of time spent foraging in each habitat type and the quantity of food obtained there. It appears that about 55% of the ibises' food came from average (*i.e.* irrigated and low-lying) pastures, 42% from dry pastures and 3% from wet pasture and aquatic areas.

European man has greatly changed eastern coastal Australia by draining swamps and clearing forest and woodland for pasture and cultivation. Goodrick (1970) showed that the loss of swampland has considerably reduced the area of waterfowl habitat in New South Wales. This also seems likely to be the case in Queensland both for waterfowl and larger swamp feeding birds such as the Glossy Ibis *Plegadis falcinellus* and the Sacred Ibis. By contrast, the Straw-necked Ibis's feeding habitat has increased with the increased area of pasture land. There seems, therefore, to be no threat to the Straw-necked Ibis in its dry season refuge areas in south-eastern Australia, providing suitable woods are left for roosting. Of concern is the likely loss of its breeding habitat in inland swamps which are being reduced by drainage and flood mitigation projects.

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ATHERTON SCRUBWRENS AT THORNTON PEAK, QUEENSLAND

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The Atherton Scrubwren *Sericornis keri* is considered by most authorities (*e.g.* Galbraith and Parker 1969, McGill 1970, Storr 1973) to be restricted to the Walter Hill Range of the Atherton Tableland. In 1975 as part of a joint faunal survey of Australian rainforests by the Australian and Queensland Museums the opportunity arose to visit Thornton Peak (16°13'S, 145°22'E) and study the avifauna. This peak reaches an altitude of 1375 m and is 100 km NE of the previously known range of *S. keri* from which it is separated by a considerable distance of unsuitable lowland habitat.

During a period of observation supplemented by netting, scrubwrens were encountered which were very similar to the Large-billed Scrubwren *S. magnirostris*. Although we were not at that time familiar with *S. keri* in the field, some individuals appeared subjectively to differ from *S. magnirostris* in their less nervous reaction to human handling. The possibility that these individuals were *S. keri* instead of *S. magnirostris* was considered despite the site being out of the known range of the former.

Two birds were collected on 4 November 1975 at an altitude of 1260 m. These were stored in spirit until returned to the Australian Museum for preparation. Subsequent identification confirmed the specimens as *S. keri*. As there are few published measurements of this species other than those given by Galbraith and Parker (1969) the pertinent data of these specimens are presented in Table 1.

TABLE 1

Characteristics and measurements of two specimens of *S. keri*.

Reg. No.	AM O. 45584	AM O. 45585
Sex	♂	♀
Weight (gm)	11.6	12.0
Total length (mm)	122	140
Wing (mm)	59	63
Wingspan (mm)	183	185
Tail (mm)	46	49
Tarsus (mm)	22.8	26.5
Iris	dark red	dark red
Bill	black	black
Leg	dark pink	dark pink

A specimen (AM 0.46245) from the base of Thornton Peak (200 m) is identifiable as *S. magnirostris*. *S. keri* is considered to be an inhabitant of higher altitudes than *S. magnirostris* and these specimens support this idea. Scrubwrens of the *magnirostris/keri* type were encountered at all altitudes and it is not known at what altitude *S. magnirostris* meets *S. keri* and whether it is replaced by or coexists with the latter at higher altitudes.

Notes on the behaviour and ecology of this and other species observed on Thornton Peak will be reported in another paper.

ACKNOWLEDGEMENTS

This field work was funded by the Australian Biological Resource Study. Specimens were collected under a permit granted by the Queensland National Parks and Wildlife Service. We thank Dr. R. Schodde for assisting in determining the identity of the specimens.

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OBSERVATIONS ON QUAIL-HUNTING STRATEGIES IN SOME AUSTRALIAN RAPTORS (AVES: FALCONIFORMES)

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SUMMARY

Quail-hunting raptors are presented with problems associated with detection and capture of prey. Several hunting strategies have been observed and are classified as solitary flushing, mediated flushing, quartering, hovering/waiting-on, and concealed and unconcealed ambush. These strategies serve the purpose of either forcing the quail to break cover or allowing easy detection of those entering exposed situations. Modification of regular hunting behaviours appears to have occurred among seven species of raptor examined. It is not possible to determine whether these modifications arose directly to counter the secretive habits of quail.

INTRODUCTION

Hunting behaviour of raptors consists of a variable, searching (appetitive) component and a stereotyped, 'fixed-action-pattern' (consummatory) component (Wallace 1979). It is this latter aspect of hunting, that is the actual attack and strike, which has traditionally been the subject of study (Rudebeck 1950, 1951; Goslow 1971). Data on the appetitive stage of hunting are largely anecdotal. Consequently, the searching behaviour exhibited by raptors towards a difficult prey item, such as quail, is of interest. The difficulty in obtaining quail is reflected in the findings of Sharland (1932), Meng (1950), Cade (1960), Craighead and Craighead (1959), Treleaven (1977) and Piozzi (1978) which indicate that quail form a small percentage of most hawks' diets.

Two families of quail, the Phasianidae and Turnicidae, are represented in Australia (Condon 1975). Individuals may typically be encountered in grassland, brush, woodland, forest, grass plains, crops, marsh flats and sandy wastes (Harrison 1978). They are largely terrestrial and have become proficient walkers (Rowley 1974) and fly only with reluctance (Harrison 1978). Sharland (1958: 6-7) notes that Brown Quail *Coturnix australis* "are remarkably clever at scattering and hiding when an enemy approaches", whereas Painted Quail *Turnix varia* are "inclined to run rather than flush when disturbed and thus escape observation". Therefore, for a quail to become attractive to a raptor as a prey item, it must initially enter the perceptive field of the searching raptor. Success in catching quail requires the reptor to utilize a strategy which facilitates early detection of 'vulnerable' individuals. The observed strategies utilized by a number of raptors are reported and examined.

METHODS

The following data were obtained during the course of routine raptor observations over a number of areas within south-eastern Queensland during the period of December 1967 to July 1979. The most frequently visited areas are listed below.

Beerwah (26°51'S, 152°57'E)
Borumba Dam (26°33'S, 152°35'E)
Caboolture (27°05'S, 152°57'E)
Cooyar (26°59'S, 151°50'E)
Dalby (27°11'S, 151°50'E)
Gallangowan (26°26'S, 152°17'E)
Helidon (27°33'S, 152°08'E)
Jimna (26°40'S, 152°28'E)
Kilcoy (26°57'S, 152°34'E)
Laidley (27°38'S, 152°24'E)
Maleny (26°46'S, 152°51'E)
Mt Tibrogargan (26°56'S,152°57'E)
Oakey (27°26'S, 151°43'E)
Yarraman (26°51'S, 151°59E)

Observations of interactions between quail and raptors commonly took place in open habitats (*e.g.* cleared forest, pastoral or agricultural situations) or lightly timbered areas with a well developed grassy under-storey. Individual observations of raptor-quail interactions were made by either prolonged observation or by chance encounters. An 'active' predator of quail is considered to be a raptor that utilizes one of the hunting modes listed by Rudebeck (1952: 223-228). Only those raptor species observed to make two or more successful 'active' forays against quail received consideration.

The term 'strategy', used here, refers to the behaviour exhibited by a raptor during the appetitive stage of its hunting *e.g.* the behaviour immediately preceding actual attack and strike. Information concerning the south-eastern Queensland distribution of all quail and raptor species referred to in the text may be found in Roberts (1979).

RESULTS

The eleven raptors which are to be considered are listed in Table 1, where they are grouped according to broad food preferences (data from Brown and Amadon 1968). Three food preference categories may be defined as follows:-

1. Generalists: characteristically, these hawks take both invertebrate and vertebrate prey. Apart from exploiting prey species which may be locally common, little, if any dietary specialization occurs:
2. Vertebrate generalists: similar to the generalist group, except that the diet consists predominantly of vertebrates;
3. Bird specialists: birds form the bulk of the diet for these hawks.

Table 2 summarises the observational data for raptor hunts directed against quail. These results conform to the general view, for example Rudebeck (1950, 1951), Grossman and Hamlet (1964) and Brown (1977), that most raptor attacks are unsuccessful. In approximately thirty observed pursuits by Australian Kestrels *Falco cenchroides* only six successful forays were conducted, but for the Australian Hobby *F. longipennis* four out of eleven pursuits ended in the capture of a quail. The generalist hawks tended to show a higher number of pursuits with a lower rate of capture than either the vertebrate generalists or bird specialists.

TABLE 1

Food preference categories of eleven raptor species observed making successful captures of quail

Generalist	Vertebrate Generalist	Bird Specialist
Black-shouldered Kite	Marsh Harrier	Collared Sparrowhawk
Australian Kestrel	Spotted Harrier	Brown Goshawk
Brown Falcon		Grey Goshawk
		Australian Hobby
		Peregrine Falcon
		Black Falcon

TABLE 2

Foraging success and prey species of raptors hunting quail

		Prey Quail				
Raptor	Forays (% success)	Brown Quail	Stubble Quail	King Quail	Painted Quail	Little Quail
Black-shouldered Kite	12 (16.7)	1	1			
Australian Kestrel	30 (20.0)	4		2		
Brown Falcon	25 (16.0)	2	2			
Marsh Harrier	14 (35.7)	2	2			
Spotted Harrier	11 (36.3)	3	1			
Collared Sparrowhawk	10 (40.0)	2		1		1
Brown Goshawk	12 (33.3)	2	1		1*	
Grey Goshawk	3 (100.0)	1			2	
Australian Hobby	11 (36.4)	1		2		1
Peregrine Falcon	10 (20.0)	2				
Black Falcon	8 (37.5)	3				

* Possibly a Painted Quail.

As noted already, quail owing to their secretive habits present a difficult problem for the predators. Before a hawk can initiate an attack, the quail must usually expose itself either on the wing or by walking into a relatively open situation. Consequently a raptor must attempt to flush the quail and attack any that break cover or, alternately, place itself in a position where it can observe quail movements, then attack those entering exposed situations.

The six strategies which have been observed in use by raptors (Table 3) are outlined as follows:-

1. *Solitary flushing.* This strategy is utilized by Black-shouldered Kites *Elanus notatus*, Collared Sparrowhawks *Accipiter cirrocephalus* and the Falcons *Falco* spp. and involves the raptor making a low level sweep over an area where quail are present. The passage of the hawk may be a brief, short dash as in the case of the Collared Sparrowhawk, a zig-zag or a linear pass, which may involve lateral movement of the body. Brown Falcons *F. berigora* in particular, are often quite vocal during the pass. If a quail is not flushed the raptor terminates the flight by perching or circling above the area. In those cases where a quail takes to flight, the raptor immediately commences direct pursuit, which ends in capture of the quail or its successfully evading the raptor. The strategem being employed is to frighten the quail so that they break cover and is the converse of the ambush tactics.

2. *Mediated flushing.* This modification of the above mode of hunting involves the raptor taking advantage of quail flushed by another party. This mode has been observed only once when a Little Quail *Turnix velox* flushed by me was stooped on and carried off by a single Australian Hobby. A similar observation is reported by Batey (1907) involving quail and a Black Falcon *F. subniger*.

3. *Quartering.* This is the standard hunting method of both Spotted *Circus assimilis* and Marsh *C. approximans* Harriers, whereby the hawk travels slowly backwards and forwards across an area in search of prey. The individual passages are variable in duration and are often punctuated by perching on low vegetation, stumps, or even the ground. During the passages, the raptor carefully searches the ground for prey, which if spotted, is immediately dived upon. Bent (1937) has described this form of hunting behaviour in the related Marsh Hawk *C. cyaneus*.

4. *Hovering/Waiting-on.* This method is carried out by the falcons and Black-shouldered Kites. The hawk either hovers or circles slowly some distance above the ground (waiting-on) and searches for quail in vulnerable positions. If suitable quarry is observed the hawk immediately stoops onto it.

5. *Concealed Ambush.* This mode of attack is characteristic of *Accipiter* spp. (Rudebeck 1950, 1951, Grossman and Hamlet 1964, Brown and Amadon 1968, Wattel 1973, Brown 1977). The hawk assumes a silent, motionless perch in vegetation from which it will "burst" out and seize unsuspecting prey. Using this method, the Grey Goshawk *A. novaehollandiae* has been observed to take Painted Quail. In each of the two observed cases, a Grey Goshawk commenced its attack from a well screened perch within the area that quail were frequenting.

6. *Unconcealed Ambush.* This strategy was utilized by all species except the three falcons which often hunt birds. Characteristically, an exposed perch is chosen by the hawk from where it searches for quail. The searching phase of this strategy, involves the hawk remaining motionless (except for head movements) for long periods of time. Spotted Harriers, Marsh Harriers, Collared Sparrowhawks and Brown Goshawks *Accipiter fasciatus* consistently chose low

perches (*e.g.* a stump or fence post) whereas the remaining species varied in their choice. In one exceptional case at Gallangowan in May 1978, a group of two Collared Sparrowhawks and six Brown Goshawks were observed in a small area of grassland which contained large numbers of Brown Quail. Two additional Brown Goshawks were observed in nearby timber using concealed ambush methods. A lone Grey Goshawk in contrast, has been observed utilizing a high, unconcealed perch from which it could stage an attack on Brown Quail. The perch was located among trees adjacent to the area frequented by quail.

TABLE 3

Number of observed successes of various strategies employed by raptors against quail

Species	Flushing		Quartering	Hover/ Waiting-on	Ambush	
	Solitary	Mediated			Concealed	Open
Black-shouldered Kite	1			1		
Australian Kestrel	1			3		2
Brown Falcon	2			1		1
Marsh Harrier			3			1
Spotted Harrier			2			2
Collared Sparrowhawk	1				2	1
Brown Goshawk					3	1
Grey Goshawk					2	1
Australian Hobby	2	1		1		
Peregrine Falcon	1			1		
Black Falcon	1			2		
Total captures	9	1	5	9	7	9

DISCUSSION

Styles (1978) recently reported on a possible specialization in the Tiny Hawk *Accipiter superciliosus* for the hunting of humming birds (Trochilidae). In this case the raptors modified their normal hunting behaviour (*e.g.* still hunting) and took advantage of the territorial behaviour of their prey.

Of the quail hunting strategies noted previously, the only cases of modified hunting behaviours seems to occur in the following species; (a) Black-shouldered Kite, Australian Kestrel and Brown Falcon with respect to the solitary flushing mode; (b) Australian Hobby and Black Falcon in using the mediated hunting mode; and (c) Brown Goshawk and Collared Sparrowhawk in using the unconcealed ambush technique.

In these cases the raptors show an alteration to their regular hunting behaviours, such that an 'uncommon' prey item becomes more amenable to the individual raptor in terms of perception and pursuit. It is perhaps significant that the vertebrate generalists, Marsh Harriers and Spotted Harriers, which normally take a large percentage of terrestrial vertebrate prey (Sharland 1932; Amadon and Brown 1970) do now show any modification of their hunting behaviours toward quail, that is, quail do not represent an unusual prey item.

Of the modified behaviours, the most difficult to interpret is the mediated flushing strategy. In some cases, it is clearly irregular and opportunistic as it is in the Australian Hobby. Some degree of regularity seems to be the case in the Black Falcon, which uses Harriers to flush prey (Shanks 1952, Austin 1953). Similar behaviour has been reported in the Peregrine Falcon (Currie 1960) and Merlin (Bourne 1960). Furthermore, Illingworth (1964) also reports the Peregrine will use humans and eagles *Aquila* in the same manner. The co-operative hunting by pairs of Peregrine Falcons (*e.g.* Grossman and Hamlet 1964; Treleaven 1977), may be an extension of this strategy. Although used with some regularity, mediated hunting may remain essentially opportunistic.

Even the spectacular group hunting of Eleonora's Falcon *F. eleonorae*, which often involves more than one hundred individual falcons, is considered opportunistic (Walter 1979). However, hunting in pairs by Peregrine Falcons is difficult to explain. The use of solitary flushing by the three generalists, although not used regularly, appears to be a generalized behaviour which these hawks employ when dealing with flying birds (pers. obs.) and is only considered modified in the sense that flying birds are rare prey items. The unconcealed ambush technique has not been regularly observed in an *Accipiter* other than the Grey Goshawk. Wattel (1973) reports that some *Accipiter's* may utilize unconcealed perches, *e.g.* Shikra *A. badius*, France's Sparrowhawk *A. francesii*, Henst's Goshawk *A. henstii* and Bicolored Hawk *A. bicolor*, for their still-hunting forays. The use of unconcealed ambush is considered here a modified behaviour in the Brown Goshawk and Collared Sparrowhawk. Wheeler (1963) reports the Brown Goshawk using a harrier-like hunting pattern. This behaviour has not been encountered during the course of my observations, but may also indicate another modified hunting strategy of this species. In the remaining, non-modified behaviours, it is often difficult to determine if the hunting behaviour is specifically directed against quail. For example, for a Collared Sparrowhawk or a *Falco* sp. making a solitary flushing flight, other bird species may be flushed and become prey items in lieu of quail, for example *Cisticola exilis*, *Malurus* species. The same may be true of any raptor using a standard hunting procedure in an area where quail are present. By placing itself in a vulnerable position by carelessness or misfortune a quail may become a prey item.

In conclusion, these observations indicate some of the methods raptors utilize in dealing with a particularly difficult prey item. However, questions arising concerning the relative success of the various hunting methods, the factors initiating predation on quail, and the relative susceptibility of different quail species/age groups to these strategies remain to be resolved.

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CATTLE EGRETS FOLLOWING THE PLOUGH

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The Cattle Egret *Ardeola ibis* is well known for the affinity with domestic animals, (*e.g.* cattle, horses, goats and water buffalo) which while feeding disturb insects and other small living creatures thereby providing prey for the alert and hungry Cattle Egret. Although it has this association, I have always noted the bird as being extremely wary of man and quick to move away, unlike some of the other egrets and cranes. However, a new facet to this bird was revealed to me in March to July 1979, when I regularly observed the following. A new playing area was being bulldozed and levelled between Wellington Point and Birkdale, Queensland. The area was fairly low and wet and a large number of Cattle Egrets (up to 40) were eagerly following the Redlands Shire bulldozers and graders as they levelled the sports area. Like a flock of crows following the plough, the egrets fed busily in the disturbed soil and seemingly had lost all their fear of man as they walked a few metres behind the machines in search of living prey.

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THE SPOTTED BOWERBIRD IN SOUTHWESTERN QUEENSLAND

Shane A. Parker

The recorded eastern limits of the Western Bowerbird *Chlamydera guttata*[1] are Paradise Bore in the Jervois Range, southern Northern Territory (Parker 1969) and, allegedly, the Stevenson in northern South Australia (Keartland in North 1901-04: 49). Up till 1972 the recorded western limits of the Spotted Bowerbird *C. maculata* in Queensland were Mt. Isa, Cloncurry, Richmond, Hughenden, Barcaldine, Blackall, Charleville, Cunnamulla and Hungerford (Dr. G.M. Storr pers. comm.). Between these limits, in January 1972, Ford and Parker (1974, incorporated in Storr 1973) observed 'spotted' bowerbirds 83 km west of Longreach, 19 km east of Fermoy, 13 km east of Middleton, Moonah Ck. 42 km east-southeast of Urandangi, and on the Georgina R. at Walkerby Hole 15 km south of Carandotta[2] and 5 km north of Roxborough Downs. However, they did not identify any of these sightings positively. Though they surmised that the birds in the central ranges of Queensland were *C. maculata*, they left open the identity of those on the Georgina R. and its tributary Moonah Ck., and recommended that specimens be collected from the latter districts for study.

In September 1976 Messrs R. Lovell and B.R. Hutchins observed what they thought was *maculata* in Coolibahs *Eucalyptus microtheca* at the Eyre Creek crossing 3 km southwest of Cluny, southwestern Queensland. On 18 September 1977 I visited this locality and collected a subadult male *maculata* (SAM B31056). The bird was in dense riverine woodland of Coolibah and the bauhinia *Lysiphyllum gilvum* (the former predominating), near a deep still pool in the creekbed. It was moving about *ca* 3 m up in the dense foliage, and giving its characteristic harsh grating call. Stomach contents of the specimen included acacia seeds and funicles, and the fruits of a *Santalum* and a mistletoe (N. Byrnes *in litt.* 28 April 1978).

This specimen extends the known range of *maculata* considerably westwards, and gives grounds for referring to Ford and Parker's earlier sightings on the Georgina and Moonah Ck., which were made in dense riverine woodland of Coolibah and the tall paperbark *Melaleuca argentea*, as this form. The question now arises: how extensive is the distribution of the Spotted Bowerbird in the Eyre Ck. - Georgina R. system? Mr. Jim Dwyer, manager of Glenormiston Station, told me in September 1977 that he had not seen bowerbirds on Pituri Ck. (a large tributary of the Georgina), but knew of them on the main river. Further south, I did not encounter bowerbirds during crossings of Eyre Ck. at Terrachi Water Hole, 4 km south of the Qld/SA border, in September 1976 and August 1977. An early record almost certainly referable to the Spotted Bowerbird is that of Sturt (1849: 386) who, pushing through the riverine

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1 This nomenclature foreshadows that in Part Two of the new RAOU Checklist (in prep.), in which the Western and Spotted Bowerbirds will be treated as separate species.

2 Not L. Katherine 22 km south of Carandotta as reported in Storr (1973) and Ford & Parker (1974).

woodland of Eyre Creek in August 1845 noted 'Cockatoos, parrots, calodera, pigeons, crows, etc., all made that solitude ring with their wild notes ..'. *Calodera* is the name by which in Sturt's day the genus *Chlamydera* was known.

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AN ADDITIONAL SIGHT RECORD OF THE MARBLED FROGMOUTH *PODARGUS OCELLATUS* IN SOUTH EASTERN QUEENSLAND

G.V. CZECHURA

OBSERVATIONS

On 6 October 1979 while I was birdwatching at Baroon Pocket (26° 43'S, 152°01'E) Blackall Range, a small, brownish frogmouth was flushed from dense vegetation on the bank of a stream. Although this bird was already in flight when first noted, it appeared to have taken wing from a perch about two to three metres above ground level. From the point of detection, the frogmouth continued its flight downstream for a further six metres before perching among lower branches of a Brush Box *Tristania conferta.* This perch was four metres above ground level and while the bird remained there I obtained good views of the bird.

Conspicuous features of the frogmouth were its slim build and small size (estimated to be three-quarters the size of *Podargus strigoides*). The tail appeared moderately long and distinctly tapered. Upper body surfaces were brownish-fawn mottled with darker brown. Scattered white spots were present on wing coverts. Undersurface was light amber-brown finely streaked with black. Upper and lower body feathers were traced with black (or black-brown) and a short whitish eyebrow was evident. Eye colour was bright orange.

The frogmouth remained on the perch for about two minutes until it

was mobbed by several Lewin Honeyeaters *Meliphaga lewinii*. A combination of this mobbing and my further approach resulted in it again taking flight. The frogmouth was lost to view within dense vegetation upslope. Despite a further search, the bird was not relocated.

DISCUSSION

Reference to recent descriptions (Slater 1970, 1978, Chapman 1976, Roberts and Ingram 1978) and Queensland Museum specimen No. 012767 (Mt. Tamborine, South-east Queensland) confirmed that the bird was a Marbled Frogmouth *Podargus ocellatus*. The present sighting was made about 26 kilometres east-north-east of the Conondale Range locality where Roberts and Ingram (1978) recorded this frogmouth.

The Baroon Pocket individual appears similar to Conondale Range individuals reported by the above authors, except that the underparts of the former bird were light amber brown (opposed to brownish-fawn) and wing spots were scattered (not arranged in 'four to seven rows'). These differences may reflect differences in sighting conditions; daylight compared to spotlight.

The Baroon Pocket bird and Queensland Museum specimen No. 012767 share a number of features in common: such as short fawnish-white eyebrows; tapering tail (see Slater 1978); body feathers traced with black/black-brown; contrasting upper and lower body surfaces and upper surface brownish-fawn mottled with dark brown. A series of fawnish-white spots on the forehead of QM 012767 were not noted in the Baroon Pocket bird.

Vegetation in that part of Baroon Pocket where the sighting was made, consisted of Brush Box *Tristania conferta* dominated forest with rainforest understorey. Chief emergents were figs *Ficus*, Piccabeen Palm *Archontophoenix cunninghamii* and Flooded Gum *Eucalyptus grandis*. This forest produced a dense leaf litter (20-30 cm in depth). Vegetation described by Roberts and Ingram (1978) appears similar despite absence of tree ferns *Cyathea* spp. and greater dominance of *T. conferta* at Baroon Pocket.

I thank Mr G. Ingram and Mr D.P. Vernon of the Queensland Museum for their comments.

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COMMENTS ON *SERICORNIS BECCARII* IN SOUTHERN CAPE YORK PENINSULA

W.E. BOLES

Although recent authors *e.g.* Parker (1970), Storr (1973), have placed the southern limit of *Sericornis beccarii* in Australia in the vicinity of Princess Charlotte Bay, Cape York, Queensland this species has been listed from as far south as Cooktown (Campbell 1934, Wheeler 1967, McGill 1970). Kikkawa (1976) recently recorded it from this district. Parker (1970) felt no problem existed in the discrimination of obscurely patterned scrubwrens on Cape York. At the time of his work, a considerable gap separated the known range of *S. b. dubius* and those of *S. magnirostris viridior* and *S. keri;* only *beccarii* had been recorded from the Cape York Peninsula north of the Atherton rainforest tract. Although Keast (1978) felt *S. beccarii* and *S. magnirostris* were apparently isolated from one another, Kikkawa (1976) considered the possibility of overlap. Further work in rainforest areas between Cooktown and Mossman indicates that these two species approach each other very closely, and in all probability, meet near Cooktown.

During a study of Australian rainforest fauna conducted jointly by the Australian Museum, Sydney and Queensland Museum, Brisbane, several sites were surveyed between Cooktown and Mossman, north Queensland. On the northernmost study area, 4 km south of Cooktown, scrubwrens were mist-netted, marked and released. Certain obscurely marked individuals were identified as *S. magnirostris* rather than as *S. beccarii* for two reasons. Firstly, none of the workers had any experience with *S. beccarii; S. magnirostris* and *S. keri* had been encountered by the team until then. Secondly, the area was outside the recently published range of this species. The facial pattern was very faint and passed unnoticed in the first birds handled. The white-tipped wing coverts proved to be the feature which led to the correct identification of the birds. Both Hartert (1899) and Mathews (1941) had previously confused dully marked specimens of *S. beccarii* with *S. magnirostris* (Parker 1970).

S. beccarii was not known to be sympatric with any other members of its genus in Australia. *S. magnirostris* has been listed by some authors (*e.g.* McGill 1970, Storr 1973), as occurring as far north as Cooktown although from the records the nearest specimen appears to be one taken at Mt. Amos on the Big Tableland during the Harold Hall Expedition (Hall *in* Hall 1974). This is no more than 24 km south of the nearest populations of *S. beccarii* at Cooktown. There are sufficient patches of rainforest and gallery forest to provide an almost continuous pathway between these sites (G.C. Stocker, pers. comm.) and it is highly probable that these two species come into contact within this area. Certainly the presence of *S. beccarii* on the west side of Cape York (Parker 1970, Kikkawa 1976) is because of its ability to move along trans-peninsula riverine vegetation.

Four specimens of the southern population of *S. beccarii* were examined. These were compared with representatives of *S.b. dubius* from the Princess Charlotte Bay vicinity to determine whether they warranted recognition as a new subspecies. Although the Cooktown

specimens differ noticeably from a cinnamonic series of *S.b. dubius* from Rocky Scrub (QM 0.5235 - 0.5239)*, an individual taken by D.P. Vernon on the Endeavour River near Cooktown (QM 0.16232) matches exactly the type series of *S. b. dubius* (type AMNH 450834, paratypes AMNH 601539, 601540). Three specimens from Cooktown (AM 0.45757 - 0.45759) are more plainly patterned than any of the other skins examined. *S. b. dubius* is a somewhat variable form (see Mayr (1937) and Parker (1970) for more detailed discussions of the plumages) but despite the differences of colouration between the cinnamonic series from Rocky Scrub and the paler, obscurely marked birds from Cooktown, the type series and Endeavour River specimen bridge this gap in plumage. These intermediates occur in both the Princess Charlotte Bay and Cooktown populations thus uniting them despite their geographical separation. The Cooktown population is referable to *S. b. dubius* (Mayr 1937).

It is surprising that no skins of *S. beccarii* have been previously reported taken from Cooktown, although there are egg specimens from this area attributed to this species (Campbell 1934, Macgillivray Collection in Australian Museum). J. Kikkawa (pers. comm.) considers it to be more abundant in this area than elsewhere on Cape York Peninsula. It probably exists in pockets of appropriate vegetation throughout the Peninsula. Kikkawa (1976) has recorded it in the north, west, southwest, east and southeast (Cooktown) of Cape York.

Of considerable interest are the interactions of *S. beccarii* with its congenors to the south. Mayr (1937) considered it to be the geographical replacement of *S. frontalis*. The northernmost record of *S. frontalis* given by Storr (1973) is from Tinaroo, Qld. Parker (pers. comm.) thinks it is possible that *S. beccarii* is prevented from spreading over the whole of the Atherton rainforest tract by *S. frontalis*, although Kikkawa (pers. comm.) points out that the former is a lowland species whereas *S. frontalis* in north Queensland is a highland species. The distribution of *S. beccarii* presents the unusual situation where a Cape York - Coen species jumps the Princess Charlotte Bay dry gap to reappear only in the Cooktown area.

Another intriguing consideration is the interaction of *S. beccarii* and *S. magnirostris*. Does the former through further loss of facial pattern and wing covert markings 'become' *S. magnirostris* south of Cooktown? Although it would require little reduction in patterning of *S. dubius* to produce a form very similar to *S. magnirostris* in outward appearance, there would also be necessitated a significant shift in feeding ecology.

Data on foraging zones of several species of *Sericornis* collected by Keast (1978) indicated that *S. beccarii* was more arboreal than *S. frontalis* but somewhat less so than *S. magnirostris* which is noted as the most arboreal of Australian scrubwrens. He felt that *S. beccarii* occupied the adaptive zone of *S. magnirostris* at Claudie River, north Cape York, where he observed it. Birds identified as *S. magnirostris* were encountered at Fritz Creek, some

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* Specimens examined were from the Australian Museum, Sydney (AM), Queensland Museum, Brisbane (QM) and American Museum of Natural History, New York (AMNH).

40 km south of Cooktown where their observed feeding habits were typical of this species. Alternatively *S. beccarii* at Cooktown was seen on the ground and in the lower strata of vegetation in a manner more reminescent of *S. frontalis* than *S. magnirostris*. This apparent shift in foraging zone may have developed if it were sympatric with a more arboreal congenor such as *S. magnirostris*. This would parallel the situation where *S. frontalis* and *S. magnirostris* are sympatric.

The small series of Cooktown birds examined contained both immature and adult birds and several age related differences were apparent. The bill of the immature, a female, was shorter than that of the adults and solid black. The bill of the adults was horn brown. The iris colour, red in the adults, was grey in the immature. In regard to this character, it is interesting to note that labels of the cinnamonic series from Rocky Scrub, list the eye colour as light brown. Mack (1953) considered these specimens to be immatures of *S. b. minimus* although Mayr (1937) had previously shown otherwise. This series is comparable to the Cooktown adults, not the immature.

The questions of the behavioural and ecological interactions of these southern Cape York scrubwrens deserve continued attention. Observations must be made and specimens collected from the critical zone between Cooktown and Mt. Amos.

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FURTHER SIGHTINGS OF THE BUSH-HEN *GALLINULA OLIVACEA* FROM SUB-COASTAL NORTHERN TERRITORY

JOHN L. McKEAN AND MIKE READ

Storr (1967) provided details of four records of the Bush-hen *Gallinula olivacea* from sub-coastal Northern Territory. These included the observations of the experienced collector McLennan (1917) who heard the species calling in long grass on the King River (Arnhem Land), N.T. Storr considered that the occurrence of the Bush-hen in the Northern Territory required confirmation.

There have been a number of further reports of Bush-hens in the Northern Territory. A bird was seen by John Bywater in the Shoal Bay area about March, 1971 (M.G. Ridpath pers. comm.). Keith Gill, who knows the species well from Innisfail, Queensland, heard what he considered to be Bush-hens calling in the Buffalo Creek area, Darwin, N.T. during late August, 1973. Two live birds were captured on February 27, 1977 in the Adelaide River township area. They were identified by Mrs. C. Cox (Cox, 1978) using Slater's "A Field Guide to Australian Birds". Unfortunately, the birds later died and the carcasses were burnt.

McKean had a sight observation on February 14, 1979 when a single bird was seen along the edge of a fresh patch of tall Spear Grass *Sorghum* sp. about 200 metres east of the bridge over Mt. Bundy Creek, on the Arnhem Highway. McKean has seen Bush-hens on a number of occasions previously in North Queensland and had no problem in immediately recognizing the species. The identification was based on size; slightly smaller than a Buff-banded Rail *Rallus philippensis* yet much larger than Australian crakes of the genus *Porzana*, and plumage; olive brown above and below, dull grey throat and breast with rufous/chestnut belly and vent. When disturbed the Bush-hen cocked its tail in the manner of a Dusky Moor Hen *Gallinula tenebrosa* and vanished quickly into the long grass.

On February 23, 1979, L. Lawrence, the owner of Green Valley farm near Pine Creek told Earl A. Gano, Wildlife Ranger, that he had found a bird's nest in tall grass and reeds in a swampy area on his farm. He had found the nest and eggs on February 19, but could not identify the bird. Mr. Lawrence showed Gano the site and a bird was disturbed that was thought to be either a Water Rail or a Bush-hen.

The nest contained 5 eggs which were creamy-white in colour with small irregular specks of faded red-brown and measured 35-40 x 28-29 mm. The nest was composed of dry swamp grasses, slightly cup shaped, about 20 cms in diameter, 4 cms deep and about 10 cms off the ground. The grass around the nest appeared to have been pulled in at the top to form a canopy.

Earl A. Gano returned to the area on March 1, 1979 and was able to identify the bird as a Bush-hen. The nest contained 3 eggs and 2 recently hatched small black chicks. The nest and contents were

photographed and a rather poor photograph was obtained of an adult bird. The nest site was revisited by Gano in company with Reed and the remnants of the nest and eggs were collected. Unfamiliar rail calls heard in the vicinity were considered by Reed (after consulting the literature) to be Bush-hen calls. McKean and Reed consider the egg fragments and photographs adequate documentation of the Bush-hen breeding in the Northern Territory.

On March 11, 1979 A.L. Hertog located a Bush-hen on the edge of a road through thick Spear Grass *Sorghum intrans* in the vicinity of a freshwater swamp near Howard Springs. The bird was clearly seen and the appropriate identification criteria noted. Another Bush-hen was seen by Hertog in the same general area on April 21, 1979. Although the area is regularly visited by Hertog there have been no subsequent sightings.

A Bush-hen ran across a track through long grass near Rainbow Pool in the El Sherana area on April 15, 1979. The bird was disturbed by a motor vehicle containing Hertog and McKean. Despite an immediate search the bird was not resighted. Roy Beames (1979) reported sighting a Bush-hen at Hayes Creek, N.T. on September 23, 1979. The habitat is suitable and his verbal description of the bird to McKean indicates the bird was correctly identified.

It would appear from the above records that the Bush-hen, while probably not common, occurs widely through the northern portion of the Northern Territory. Increasing widespread burning during the dry season may account for its apparent rarity. We would not be surprised if the species were found to occur also in the contiguous parts of Western Australia.

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PIGEONS MISTAKEN FOR PREDATORS BY PASSERINE SPECIES

F.T. MORRIS

In the rainforest fringe around my home at Smithfield Heights, North Queensland, I saw several instances which suggest that at least two of the resident species of pigeon (Topknot Pigeon *Lopholaimus antarcticus* and Brown Cuckoo-dove *Macropygia amboinensis*) are, under certain curcumstances, mistaken by passerine species to be predatory birds. The pigeons evoked alarm and stress reactions of aggression from some passerines. A Black Butcherbird *Cracticus quoyi* was aggressive toward a Topknot Pigeon resting in the forest canopy.

On 17 April 1979, a small flock of 10 to 12 Topknot Pigeons had been feeding for some time on fruits high in the foliage and some of the birds, which had had their fill, were resting on horizontal branches. Some preened busily others simply rested, sitting slightly to one side upon one wing, while the remainder continued to feed. Quite suddenly, one of the perched pigeons was attacked by a Black Butcherbird. The pigeon was repeatedly harassed in noisy dives close to its head, and on several occasions the butcherbird approached the pigeon directly by walking along the branch in a side-stepping gait to within near pecking range. No actual contact was made by the attacking bird and the Topknot Pigeon took little heed of the aggressor, only shifting into an upright perching stance and preening occasionally. Perhaps this was done as a displacement activity, but as the bird seemed at ease this is unlikely.

As the pigeon could pose no threat to the Black Butcherbird's food supply and was therefore not a competitor, it must be assumed that the aggression was stimulated by mistaken identity and that the pigeon was thought to be a predator. Pacific Baza *Aviceda subcristata* is a frequently seen bird of prey in the area, and I feel that it was with this species that the attacking bird confused the pigeon. The Topknot Pigeon and the Pacific Baza show similarity of colouring, size and silhouette when viewed under the dappled light of the forest canopy. Also, the pigeon was perched in a very stationary attitude when initially attacked and may not have appeared true to type, even among others of its kind.

Likewise, on two occasions during June 1979, a Brown Cuckoo-dove was mistaken as a predatory bird by a Yellow-spotted Honeyeater *Meliphaga notata*. Again the pigeon could not pose any threat to the smaller birds, but nevertheless its rapidly travelling silhouette caused calls of alarm from the honeyeaters. The pigeon flew a direct course, just above the canopy of the secondary growth and its progress could be mapped once obscured by foliage, from the calls of other Yellow-spotted Honeyeaters. This chain reaction of calls occurred on both occasions and with the same fervour as when a predator is overhead.

Collared Sparrowhawk *Accipiter cirrhocephalus* is a resident species in the area and a pair patrols the forest fringe, just above the canopy and over the adjoining secondary growth. It is with this raptor that I feel the pigeon had been mistaken by the

honeyeaters, as there is a similarity between the flight silhouettes of the Brown Cuckoo-dove and the Collared Sparrowhawk when seen in direct, level flight. Tinbergen (1948) reported that both outline and movement of certain shapes were significant visual characteristics to release fear reactions in prey species. All shapes which gave rise to a fear response in their experiments were hawk-like in character, as must the silhouette of the Brown Cuckoo-dove overhead to the Yellow-spotted Honeyeaters, causing an instant alarm response.

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SHINING FLYCATCHER AT WELLINGTON POINT

V. COOPER

On 17 September 1979, at about 0700 hours I was approaching a freshwater dam situated in a paddock which has its southern side bounded by Hilliard's Creek (approx. 27°30'S, 153°10'E). This creek is tidal salt water at this locale and has mangroves growing along both sides. On the southern or far side from where I was, there are extensive areas of mud flats and dense mangroves.

Some ripples on the surface of the dam alerted me to a possible drinking bird. As I cautiously looked over the bank a bird did move up from the lower branches of a wattle tree *Acacia cunninghamia* which trailed in the water. The white underparts were prominent, even though the bird was perched in the shade and I thought it was a member of the Flycatcher family. It moved higher into the full sunlight and I quickly made a sketch of the bird while I observed it through binoculars. The black head and striking warm chestnut back and tail gave me an easy identification when I checked it in Slater (1974). The bird, a female Shining Flycatcher *Myiagra alecto* uttered a few rasping calls very similar to the call of the Restless Flycatcher *M. inquieta* with which I am very familiar. Up to this date, 24 September 1979, I have not seen the bird again at this dam, even though I have been back almost every morning.

Slater (1974), refers to the southern limit of this bird's range as Noosa, Queensland. Macdonald (1973) refers to it "as possibly sedentary" so the bird may have been passing further south, or we may have a breeding population at Wellington Point in the Hilliard's Creek area.

This dam is much favoured by the birds in the vicinity and there is a procession of various species to this spot. Noted at the waterhole at the same time were three Grey Fantails *Rhipidura fuliginosa* and a male and female Leaden Flycatcher *Myiagra rubecula*, so the insect population must be adequate in the immediate vicinity.

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KOEL BEHAVIOUR

THELMA DENNY AND DONNA DUDMAN

September in south-eastern Queensland heralds the arrival of the Koel *Eudynamys scolopacea* to our area. One immediately notices its presence by the frantic calling and the association with the rainy season, hence the name "Storm Bird".

There are at least 3 pairs in the territory of approximately 225 hectares. However one particular pair interested us in our research of field sightings for the Atlas of Australian Birds.

Close to my assistant's house is a Brazilian Cherry Tree *Eugenia uniflora* and 11 m away, a Camphor Laurel *Cinnamomum camphora* which gives the Koel protection for its skulking habits. It was discovered in December 1979 that instead of both birds just sitting in the Cherry Tree and feeding, the female stayed in the Camphor Laurel. We found that they had built a platform. Although it was saucer shaped like a nest, it was apparently used for feeding only and definitely associated with courtship feeding, as practiced by some other species of bird.

The platform rested on a knot in the branch of the Camphor Laurel, where several new growth shoots kept the fragile object, which consisted of twigs 10 cm long, in place. The platform was 3m above ground, its width was 8 x 5 cm and had a base 2 cm thick.

The male went and picked ripe cherries, eating two himself, then taking one to the female on the platform in the Camphor Laurel Tree. She retained this berry in her bill and the male returned to the Cherry Tree where it fed again. On his return with another fruit, the female swallowed the berry which the male had given her earlier, then took the offered one, and the whole ritual was repeated.

This feeding territory was sustained for about one month, as long as ripe fruit was available. The 'nest-platform' was not photographed because of the dense foliage and fear of disturbing the pair. The arrangement of twigs must have been fragile because subsequent storms blew the platform away.

THELMA DENNY, Isis Central Mill, via Childers, Queensland.
DONNA DUDMAN, Isis Central Mill, via Childers, Queensland.

REVIEW

AUSTRALIAN BIRDS AND THEIR YOUNG. A portfolio of paintings of breeding species of the eastern states. Paintings by Gladys O'Grady with text by Terence Lindsey. 282 pages. Cassell Australia. 1979.

Although this is the first time her paintings have been presented in a book, many people already know of the artistic talents of Gladys O'Grady. Some of her paintings appeared years ago on the covers of the New South Wales Gould League Notes, and RAOU members will remember the O'Grady sisters and their paintings at campouts in the 1960's. This portfolio represents only a small proportion of the vast number of her paintings which span many years.

The painting style is highly original and consistent, although a small amount of variation, possibly related to time, is evident between some plates. The paintings are uncomplicated and sometimes incredibly brief, with a minimum of detail being recorded, even though an entire background is usually provided (*e.g.* Yellow Robin pl. 49). This is the essence of an artist who can capture a visual moment - an experience - simply, and is not inhibited by lack of fine detail. Her paintings frequently create atmosphere (*e.g.* pl. 26, Brown Pigeon) and they reach their peak in Plates 6, 20 and 28. Her paintings may not appeal to everyone as usually the birds are rather flat (she seldom considers shadows), and the feet have a muchness about them. Technically, many people would not like some of her head shapes (particularly the Whistlers) and there is something awkward about the position of the Welcome Swallow's nest (pl. 43).

Her attention to the colour of soft parts of breeding birds (particularly egrets) and the detail of recently hatched chicks reflects Gladys O'Grady's intimate knowledge of birds. This information along with the details of nests makes the book an important and unique contribution to this area of ornithology.

My major criticism of the paintings is that they do not show the year in which they were painted; some plates are unsigned, and at least one is double signed. A minor one is that the iris of a Spur-winged Plover has always appeared yellow to me.

I found her reminiscences of the early days on the Clarence River delightful, and I would like to see an extended version published as they contain interesting and historically important information.

Terence Lindsey's text is lucid and informative. For the ten or so years he has been in Australia, Terence Lindsey has acquired an enormous amount of knowledge about Australian birds. The text contains numerous interesting facts, often gained from personal experience, hence the book contains important original information which is not available in other bird books (*e.g.* incubation times).

There are a few ambiguities and occasional controversial statements in the text (*e.g.* the present distribution of Plum-headed and Spice Finches involves more factors than competition). I have seen other descriptions of the nest of the Grey Fantail (pg. 201) where the authors have also described the nest as being similar to an *inverted* wine glass. Surely they must mean an *upright* wine glass.

The design and layout of the book is reasonably pleasing. People who don't like the shape (30 cm wide, 22 cm tall) may change their minds when they see how easily the book stays open at a given page.

The binding is firm but several instances of mechanical damage to pages occurred in the reviewer's copy. Fortunately these were not on plates. Colour reproduction is accurate with only one or two minor registration faults (*e.g.* Plate 12). The printing is dark and crisp and only an occasional faded letter was noted.

Editorial errors were minimal but a number of spelling errors were found. The caption for Plate 16 reads "Adults at nest with eggs", - but only one bird is present. The caption for Plate 27 contains a confusing double vernacular - "nest in red bottle-brush ti-tree".

In conclusion, Cassells have made an important contribution in recording an Australian bird artist. Gladys O'Grady's paintings have been given the recognition they deserve and she will not join the ranks of several other talented Australian bird artists who have remained in obscurity. It would be nice if another portfolio of her work could be produced. The text by Terence Lindsey compliments Gladys O'Grady's plates admirably, and makes pleasant and interesting reading.

The book is a must for anyone interested in Australian ornithological art, and since it contains much unique information on breeding birds, their nests, eggs, and chicks, most people interested in natural history will find it a worthwhile addition to their library. At $25.00, the book should also appeal to people buying coffee table picture books.

LES HALL.