THE SUNBIRD

OBSERVATIONS ON THE BEHAVIOURAL DEVELOPMENT
OF YOUNG ROSELLAS

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SUMMARY

The behavioural development of four young, hand reared
Platycercus eximius and three *P. adscitus* was observed
from 20 to 55 days. The development and interrelation
of motor skills associated with feeding activities as
well as perching, body maintenance and locomotory
activities are described. Until fledging at about 30
days only the perching response was well co-ordinated.
Allopreening and food sharing amongst the young
P. eximius were seen between 20 and 33 days. There was
a rapid development of motor skills related to locomot-
ion, body maintenance and feeding between 30 to 40 days,
by which time the birds were feeding independently.

INTRODUCTION

While there have been various studies relating avian growth patterns
in terms of body weight and the evolution of developmental strategies
(see Ricklefs, 1968, 1973) there is a paucity of information on
behavioural development. Knowledge of developmental stages of
different species is important in the reconstruction of behavioural
phylogenies (Horwich, 1969; Smith, 1975) and can aid in the under-
standing of adult patterns of behaviour. For example Newton (1967)
suggested that the way in which feeding habits of different species
arose during ontogeny and evolution are relevant to the problems of
speciation.

Except for certain detailed studies of young passerines (see Nice,
1939, 1941, 1943; Fautin, 1941; Banks, 1959; Balph, 1975) as
well as some non-passerines (see Gross 1935; Tinbergen, 1953) data
are lacking for most species. This is particularly true for parrots
which generally nest in tree holes and present particular problems
for field study (Forshaw, 1973). Apart from studies such as Dilger's
(1960) of the African parrot genus *Agapornis* information on parrot
development consists of anecdotal observations of aviculturists
(Forshaw, 1969, 1973; Smith, 1971, 1972 a, b, 1975).

The incidental observations of the development of hand reared young
rosellas reported here were part of a broader study of the feeding
biology of the Eastern Rosella *Platycercus eximius* and the Pale-

headed rosella *P. adscitus* (Cannon, in prep.). The development of
motor skills associated with perching, locomotion and manipulative
ability (using the beak and feet) are of interest in the successful
attainment of independent feeding in young birds and their consequent
survival. According to Forshaw (1969) *Platycercus* species lay eggs
at irregular intervals, usually of two days, until the clutch is
complete. Incubation lasts about 21 days; young leave the nest at
about 30 days but do not become independent until 45 to 60 days of
age (Brereton, 1971).

<div align="center">METHODS</div>

Four *P. eximius* nestlings were collected at approximately 19 days
of age near Warwick, Queensland and three *P. adscitus* nestlings at
approximately 17 days of age at Brookfield, Brisbane, Queensland in
December, 1972. These seven rosellas were hand reared for laboratory
studies on food selection (Cannon, in prep.). The birds were fed
four times daily on a mixture of one part wheatgerm, two parts high
protein baby cereal, one part grated yolk of hard boiled egg, mixed
with a little milk to a fairly stiff consistency. In addition, each
bird was given 0.5 to 1.0 ml of a super saturated solution of glucose
at the beginning of each feed and a complete vitamin and mineral
supplement ("Pentavite") once a day. At about 30 days of age a small
amount of soaked commercial budgerigar seed was added to the diet and
the proportion of seed was increased until the birds were feeding
independently at approximately 40 days of age. At first the birds
were housed together on shredded paper in a cardboard box; addition-
al heating was provided by a 60 watt light bulb suspended above the
box. The temperature was maintained at about 26°C. Once the birds
were flying they were housed in a cage with solid wooden back and
sides and a wire front and top; birds were placed in an outside
aviary at 41 days.

Observations of the rosellas were made principally at feeding times
from when the birds were about 20 days until about 55 days of age.
The four *P. eximius* were survivors of a clutch of seven eggs. The
previous nesting history of the three *P. adscitus* was unknown. One
P. eximius (E4) died at 33 days of age of unknown causes. All birds
were recognized individually.

<div align="center">OBSERVATIONS</div>

Since differences in size and development between siblings of the
same clutch were evident and the exact age of the birds was unknown,
the estimated age of the birds represented an average age for each
clutch. Development of activities in the captive rosellas is summar-
ized in Table 1. Behaviour is described within several general
categories, responses concerned with perching, locomotion, body
maintenance and feeding. Differences between the species are noted
where appropriate.

Perching

Both species were able to stand at the commencement of observations
(i.e., day 20), but the grasping action of the toes was poorly
developed. Although the two larger *P. eximius* showed an increased
ability to grasp a finger all birds were still unable to balance on
a perch on day 21. By day 22 the two larger *P. eximius* were able
to perch on a small branch; all seven rosellas could perch with

good co-ordination by 24 to 25 days. Initially all rosellas slept
or rested in a group in a horizontal position with breast close to
the floor of the box and head tucked down. Once they were able to
perch birds usually slept more vertically within the box, although
they did not use perches while sleeping until they were placed in
an outside aviary at 41 days.

Locomotion

Initially all birds were unsteady when walking on a flat surface,
but all could do so by day 23/24. Birds were able to walk side-
ways along a perch as well as foot over foot by day 36/37. Unsuc-
cessful attempts to turn around on a perch were first made on day
30 and by day 36/37 most birds were capable of this without
falling off the perch. Climbing using the beak was first seen on
day 21 when one *P. eximius* attempted to climb out of the home box,
however, climbing between perches was not seen until day 27 though
by day 32 most birds could successfully do this. It was then (day
32) when birds first attempted to jump between perches, a skill
which most birds had by day 36/37. Flying was preceded by fanning
of the wings, which birds were doing at the commencement of observ-
ations. The first flight between perches was made by one
P. adscitus on day 26; by the next day one *P. eximius* and the
other two *P. adscitus* made short descending flights from a perch
0.5 m high to the floor. The three remaining *P. eximius* first
flew between days 29 to 31. Co-ordination upon landing was poor
at first, but improved rapidly, thus four to five days after the
first flight all birds were capable of accurate landing.

Body maintenance

All birds attempted to preen from the outset, mainly nibbling the
breast feathers; in addition the three *P. adscitus* attempted to
preen the tail and wing. The largest *P. eximius* was able to preen
its tail successfully on day 26; two days later all birds were
able to nibble their tail feathers. Well co-ordinated preening
(running the beak along the feathers and nibbling simultaneously)
of the tail and wing feathers was apparent by day 31/32. Allo-
preening was not seen in the wild adults of either species,
however, the captive *P. eximius* were observed to preen one
another. On day 20 one *P. eximius* nibbled the feathers around
the beak of another and two days later allopreening was extended
to the feathers around the eyes. During the next six or seven
days the entire head was being preened, but allopreening was not
seen after day 32/33. The *P. adscitus* were not observed to allo-
preen.

Both species have similar wing stretching movements, either both
wings are raised over the back or one wing is extended backwards
and downwards together with the leg on that side as well as part of
the tail. Birds could raise both wings from the beginning. Attempts
were made to stretch one wing on day 20, however, a complete wing
stretch involving a leg and the tail was not apparent until day 29/30
because until then birds were unable to perch successfully on one
leg. On the first day one *P. eximius* was seen to wipe its bill along
the edge of a cardboard box. Bill wiping from side to side as well
as along a perch was common among both species by day 29/31.

Members of the genus *Platycercus* all show over the wing of indirect

head scratching behaviour (Brereton and Immelmann, 1962). One
P. adscitus first attempted to scratch over the wing and one *P. eximius*
under the wing on day 31. Subsequently by day 37/38 all birds had
developed the usual scratching pattern. An attempt to bring the foot
towards the beak for cleaning was first seen on day 29; the ability
to co-ordinate this behaviour developed gradually so that most birds
could successfully clean either foot by day 37. Although birds
showed some interest in a water bath from 38 to 40 days, they did not
attempt to bathe; however, by 45 to 50 days complete bathing movements
were seen. Following a bath birds retired to a perch for a prolonged
bout of preening. Adult drinking behaviour (dipping the head into the
water and holding the head up while swallowing) was first seen on day
39.

Feeding

All rosellas were hand fed until day 40/41 when they were placed in
an outside aviary. Initially the four *P. eximius* stood while being
fed, while the three *P. adscitus* crouched. Gradually, however, all
birds stood while being fed. All birds vocalized during feeding,
they also defaecated both during and after feeding. During the
period until 40 days there was a progressive development of indepen-
dent feeding behaviour accompanied by fine motor co-ordination of
beak and feet. The development of feeding behaviour is described in
terms of (i) pecking and mandibulating responses; (ii) ability to
hold items in the feet; (iii) beak-foot co-ordination; (iv) indepen-
dent feeding responses; and (v) food-sharing.

(i) Pecking and mandibulating responses: Exploratory pecking, i.e.,
pecking at an object without picking it up, was seen on day 20 when
birds pecked at a plastic container. Initially birds directed pecks
towards various objects, e.g., small pieces of paper, dried faeces,
leaves that contrasted visually with the background. All rosellas
were directing pecks towards small seeds more frequently by day 28/
29. The ability to mandibulate items in the beak developed in assoc-
iation with the pecking response. At the beginning of observation
one *P. eximius* nibbled the side of the cardboard box, two days later
all birds were nibbling dried leaves. Although commercial budger-
igar seed mixture was available to the birds from this time it was
not until day 28 that one *P. eximius* and the three *P. adscitus* tried
to pick up and mandibulate seeds in the beak. Three days later all
birds were attempting to mandibulate small seeds and grass stems.
Two *P. eximius* were observed to move the upper mandible inside the
lower mandible, moving the tongue around the inside of the beak on
day 32/33; this behaviour is associated with the positioning of
seeds in the beak to crack them. At this stage all birds were more
adept at husking small seeds and by 36 days the birds were able to
mandibulate larger items such as short pencils, matches and grass
and herb stems. On day 37, birds were presented with a range of
larger seeds (sunflower, sorghum, oats) than previously experienced.
One *P. eximius* opened seven sunflower seeds by positioning the seeds
in the beak with the aid of the tongue, but did not manage to crack
sorghum or oat seeds. By the following day, all birds had success-
fully opened sunflower seeds and over the next four to five days
birds became more adept at cracking seeds such as sorghum and oats.
When moved to an outside aviary at 41 days birds spent a considerable
amount of time mandibulating various objects such as string, leaves
and bark.

(ii) Ability to hold items in the feet: Adult rosellas do not pick up food items directly with the feet, instead an item is picked up in the beak and then transferred to a raised foot. The ability to grasp items in the foot developed more gradually than the pecking and mandibulating skills. The grasping action of the foot developed in association with the perching response and was well established by 27 days. Birds were able to grasp a large item such as a pencil if placed directly in the foot by 25/36 days, but were unable to transfer such an item to the beak. The birds were unable to hold small items in the feet at this stage.

(iii) Beak-foot co-ordination: Successful foot cleaning behaviour and the use of the feet in feeding are interrelated; until a bird can accurately bring the foot towards the beak it is unable to transfer an item between foot and beak. One *P. eximius* was seen perching on its left foot, raising the right foot from the perch on day 34. During the next two days most birds attempted to bring a foot towards the beak. I have observed wild fledglings at a similar stage of development spend time perching on one foot, while stretching the other foot out and up towards the beak, without necessarily holding anything in the beak. Attempts to transfer objects from the beak to the foot frequently resulted in the item being dropped. Young wild birds have been seen to mandibulate leaves in the beak, attempting to hold the leaves in either foot. Although by 37/38 days birds could hold items in the beak or foot, the beak-foot co-ordination was still not fully developed. Birds were incapable of transferring items between beak and foot until 44 to 45 days, although they would practice using objects such as bark, dried leaves and string.

(iv) Independent feeding: As early as 22 days one *P. eximius* put its beak into a dish of the cereal/egg mixture and by 28/29 days most birds attempted to pick up and mandibulate small seeds. Subsequently, all birds attempted to feed on the cereal/egg mixture by day 32/33 while becoming more difficult to hand feed. Rosellas fed on the cereal mixed with small seeds and fresh food (grass and herb seeds) by day 37/38. During the next two days most birds were able to crack larger, particularly sunflower, and were feeding more independently. Independent feeding was established after 40 days and from 45 days all birds included larger seeds in their diet.

(v) Food sharing: A behaviour which is called 'food sharing' was first seen on day 20, a smaller *P. eximius* begged for food from a larger *P. eximius* by nibbling around the sides of the beak. The larger bird passed some food to the smaller one. During the next day the two smaller *P. eximius* both obtained food from the same larger bird, both prior to and after being hand fed themselves. This food sharing behaviour generally involved these same birds; it continued with decreasing frequency until about day 33. Only on two occassions were *P. adscitus* involved in food-sharing, once intra-specifically and once interspecifically. It is not known if food-sharing occurs naturally. I have not seen this behaviour amongst young wild rosellas, although beak-fencing has been observed between siblings. Courtship feeding occurs in the adults of both species.

Birds had just began to feed independently when moved to an outside

aviary, although beak-foot co-ordination did not fully develop for
another four or five days. In all other respects the young birds
were behaving like adults save for bathing which was incorporated
into their behavioural repertoire by about day 45 to 50. The obser-
vations were terminated at an estimated age of 56 days.

DISCUSSION

Compared with other parrots such as lorikeets, rosellas have relat-
ively short nestling periods, fledging at 28 to 30 days and attaining
independence at 45 to 60 days (Brereton, 1971).

The ages at which various behavioural activities were apparent in this
study may not exactly follow the ages at which they appear in the
field since, despite the observational advantages, the environment
is artificial. The general sequence of appearance of events, however,
would appear to follow those reported for other young birds (see
Ricklefs, 1966; Horwich, 1969; Nice, 1943).

Nice (1943, 1962) has outlined a series of ontogenic periods which
standardize the dimension of time and allow for the comparison of
developmental histories of different species. The approximate lengths
of the ontogenic periods of rosellas observed in this study are shown
in Table 1. During the last third of nestling life (Nice's stage III
of Transition period - captive rosellas 20 to 28 days) the birds were
initially capable of little more than standing, although the perching
response (grasping and balancing) was well co-ordinated by the end of
this period. The survival value of the bird being able to perch well
immediately upon leaving the nest has been emphasised by Holcomb
(1966 a, b). The rosellas were able to walk on a flat surface and
other activities such as climbing, preening and wing fanning were
attempted at this time. The limited array of activities exhibited by
the young bird at this stage are related to the restricted nest
environment (Ricklefs, 1966). However, once the young bird leaves
the nest new behaviour patterns necessary for the survival of the
fledgling in a more complex environment appear.

During the initial post-fledging period (Nice's Locomotory period-
captive rosellas 29 to 35 days) there was a rapid development of motor
co-ordination, particularly in relation to locomotion. The attainment
of flight and perfection of activities such as climbing and turning
around on a perch was evident with young rosellas. Similar findings
have been reported for other young birds (Horwich, 1969; Nice, 1943).
By the end of this locomotory period, preening was well established
and associated with this skill the rosellas were capable of mandibul-
ating items in the beak. From this stage until the birds were inde-
pendent (Nice's socialization period - captive rosellas 36 onwards)
motor skills associated with feeding developed so that the birds could
hold items in both the beak and feet, however, transfer of items
between the beak and feet was not fully developed. Activities assoc-
iated with body maintenance were all established except for bathing.
Thus between 20 to 45 days the birds progressed from being able to do
little more than stand to becoming independent; in particular the
period between 30 to 40 days was a time of rapid development of motor
skills associated with locomotion, body maintenance and feeding.

Survival of the young rosella depends in part on its ability to feed
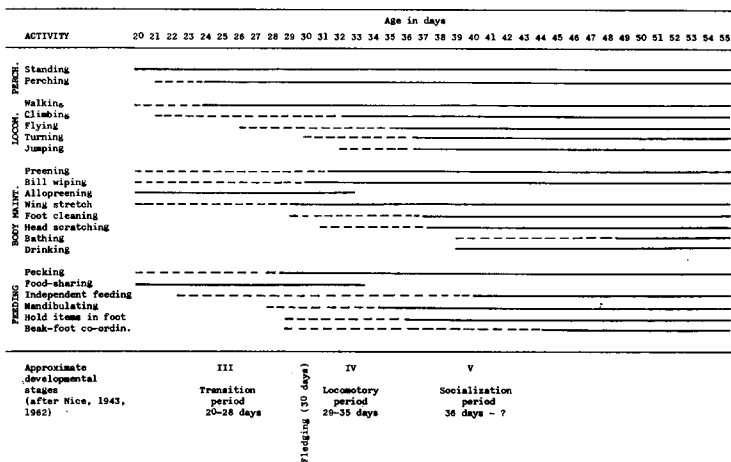itself. Feeding independence requires the maturation of fine motor

ACTIVITY	Age in days
	20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55

PERCH.
Standing
Perching

LOCOM.
Walking
Climbing
Flying
Turning
Jumping

BODY MAINT.
Preening
Bill wiping
Allopreening
Wing stretch
Foot cleaning
Head scratching
Bathing
Drinking

FEEDING
Pecking
Food-sharing
Independent feeding
Mandibulating
Hold items in foot
Beak-foot co-ordin.

| Approximate developmental stages (after Nice, 1943, 1962) | III Transition period 20-28 days | Fledging (30 days) | IV Locomotory period 29-35 days | V Socialization period 36 days - ? |

Table 1   Onset (- - - -) and duration (————) of activities in young rosellas observed from 20 to 55 days.

co-ordination of the feeding structures, in the case of rosellas, the beak and the feet. Many of the necessary motor skills associated with feeding are related to a range of activities such as perching, locomotion and body maintenance. Thus the young bird must be able to balance on one foot prior to being able to use the other foot to hold food items. Such motor skills are learned patterns of behaviour and largely developed after fledging. During the ontogeny of feeding behaviour the young bird most not only perfect the use of these skills by practicing but must also learn when to apply them under appropriate circumstances (Newton, 1967) such as the ability to discriminate between edible and inedible food items.

There is an obvious need for further detailed investigation of the behavioural development of young parrots, particularly the process of socialization during post-fledging of those species (such as *P. eximius*) which are gregarious for part or all of their life.

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REFERENCES

Balph, M.H. 1975. Development of young Brewer's Blackbirds. *Wilson Bull.* 87: 207-230.

Banks, R.C. 1959. Development of nestling White-crowned Sparrows in central coastal California. *Condor* 61: 96-109.

Brereton, J. Le Gay. 1971. Inter-animal control of space. In: *Behaviour and Environment : The Use of Space by Animals and Men.* (A.H. Esser (Ed.)). New York : Plenum Press.

Brereton, J. Le Gay and Immelmann, K. 1962. Head-scratching in the Psittaciformes. *Ibis* 104: 169-175.

Dilger, W.C. 1960. The comparative ethology of the African parrot genus *Agapornis*. Z. *Tierpsychol.* 17: 649-685.

Fautin, R.W. 1941. Development of nestling Yellow-headed Blackbirds. *Auk* 58: 215-232.

Forshaw, J.M. 1969. *Australian parrots.* Melbourne : Lansdowne.

Forshaw, J.M. 1973. *Parrots of the World.* Melbourne : Lansdowne.

Gross, W.A.O. 1935. The life history cycle of Leach's Petrel *Oceanodroma leucorhoa leucorhoa* on the Outer Sea Islands of the Bay of Fundy. *Auk* 52: 382-399.

Holcomb, L.C. 1966a. The development of grasping and balancing in nestling of seven species of altricial birds. *Wilson Bull.* 78: 57-63.

Holcomb, L.C. 1966b. Red-winged Blackbird nestling development. *Wilson Bull.* 78: 283-288.

Horwich, R.H. 1969. Behavioural ontogeny of the Mockingbird. *Wilson Bull.* 81: 87-93.

Newton, I. 1967. The adaptive radiation and feeding ecology of some British finches. *Ibis* 109: 33-98.

Nice, M.M. 1939. Observations on the behaviour of a young Cowbird. *Wilson Bull.* 51: 233-239.

Nice, M.M. 1941. Observations on the behaviour of a young Cedar Waxwing. *Condor* 43: 58-64.

Nice, M.M. 1943. Studies on the life history of the Song Sparrow. 11. *Trans. Linn. Soc. New York,* 6: i-vii: 1-328.

Nice, M.M. 1962. Development of behaviour in precocial birds. *Trans. Linn. Soc. New York,* 8: i-xii: 1-211.

Ricklefs, R.E. 1966. Behaviour of young Cactus Wrens and Curve-billed Thrashers. *Wilson Bull.* 78: 47-56.

Ricklefs, R.E. 1968. Patterns of growth in birds. *Ibis* 110: 419-451.

Ricklefs, R.E. 1973. Patterns of growth in birds. II Growth rate and mode of development. *Ibis* 115: 177-201.

Smith, G.A. 1971. Black headed Caiques *Pionites melanocephala. Avicult. Mag.* 77: 202-218.

Smith, G.A. 1972a. Some observations on Ringnecked Parrakeets. *Psittacula krameri. Avicult. Mag.* 78: 120-137.

Smith, G.A. 1972b. Nesting and nestling parrots. *Avicult. Mag.* 78: 155-164.

Smith, G.A. 1975. Systematics of parrots. *Ibis* 117: 18-68.

Tinbergen, N. 1953. *The Herring Gull's World: A Study of the Social Behaviour of Birds.* London : Collins.

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ESTIMATES OF THE POPULATION SIZES OF THE BLACK NODDY
AND WEDGE-TAILED SHEARWATER AT HERON ISLAND IN 1978.

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INTRODUCTION

Heron Island is a coral cay of the Capricorn Group at the southern
end of the Great Barrier Reef (23°26'S, 151°51'E). It is about
19ha. in area and roughly oval in outline. Its vegetation has
been described and mapped by Fosberg (1961) and Walker (1972).
The zonation of terrestrial plant communities, and aspects of
their interactions with sea-birds and turtles are described respec-
tively by Gillham (1961) and Bustard (1972). About one third of
the island has been extensively changed by the buildings and tracks
of the tourist resort and research station situated on the western
end of the cay. Most of the remainder is dominated by forest of
Pisonia grandis of which four intergrading types can be recognised
(Walker, 1972):

    1A,   tall (17m) dense forest with closed canopy;
    1B,   lower forest with closed canopy;
    1C,   varying height and suffering some disturbance, canopy not
           continuous;
    1D,   forest including *Cordia subcordata*.

All of these types, with the possible exception of 1D, probably
represent stages in the development of the *Pisonia* population
following cyclone damage. All include occasional individuals of
Celtis paniculata, Ficus opposita, Pipturus argenteus and *Pandanus*
sp. In addition narrow coastal fringes dominated by *Scaevola
taccada, Tournefortia argentea, Casuarina equisetifolia* and
Pandanus sp. can be distinguished in areas of recent progradation,
and there is a small area with abundant *Cordia* (Gillham, 1961).

Kikkawa (1970) reviewed the ornithological literature dealing with
the island and presented a comprehensive species list. Since then
further observations have been given by Bingham (1977). Wedge-
tailed Shearwaters and Black Noddies are the most abundant breeding
birds. Shipway (1969) estimated their numbers at 8300 pairs and
8500 pairs respectively in 1965, but stated that his method of estim-
ation "certainly produced an underestimate" of the latter. Kikkawa
(1970) and Bingham (1977) both refer to "tens of thousands" of
noddies. During a study of the population dynamics of *Pisonia
grandis* in 1978 I counted shearwater burrows and noddy nests in
representative samples of two vegetation types, and the results
are presented below.

METHODS

Field work was carried out between 14 October and 5 November 1978.
Two square stands each 1/10th ha. in area were marked out in forest

types 1A and 1C.   In each stand all stem 1cm diameter at 50cm above
the ground were identified and their diameters recorded.   *Pisonia
grandis* normally grows in small clumps of stems with a common base,
and measurements were made above this basal swelling.   The largest
trunk in each clump was marked with a numbered aluminium tag.   Noddy
nests were counted in each tree in the area, but no attempt was made
to differentiate occupied from unoccupied nests.   Shearwater burrows
were counted while I traversed back and forth across the stand follow-
ing the tree enumeration.   Obviously unoccupied burrows, choked with
leaves and twigs, were not counted.

LOCATION OF STANDS

Because all the large trees in the two stands were marked with small
aluminium tags nailed to the trunks, remeasurement of the trees and
further census of the bird population will be possible in the future.

Stand 1.   37m from NE corner of research station unit D3 on a magnetic
           bearing of 70° to the SW corner of the stand.   This corner
           encloses a large *Pisonia* tree labelled 1 on an Al. tag.
           From this corner the stand is orientated on the cardinal
           compass points.

Stand 2.   56m SE from the SE corner of a galvanised steel garage
           situated just off the track from the tourist station to the
           north beach.   This bearing locates the SW corner of the
           stand which was marked with orange plastic tape on a *Pisonia*
           tree labelled with Al. tag no. 31.   This stand was also
           orientated on the cardinal compass points.

RESULTS AND DISCUSSION

The results are summarised in Table 1 (vegetation) and Table 2
(bird population).   Both stands contained the same numbers of large
Pisonia trees and "clumps".   In stand 2 however the clumps contained
fewer small stems, the canopy was lower and more open, and there was
a larger proportion of subsidiary tree species.   When these observat-
ions are taken in conjunction with the larger proportion of leaning
and fallen trees it appears that this forest type (1C) represents
regrowth following the partial destruction by wind of forest that
formerly resembled more closely that of type 1A (stand 1).   Cyclone
damage to Heron Island was extensive in 1967 (Bustard 1972), many
trees were blown down and the noddy population temporarily reduced
(Kikkawa 1970).   In stand 2 and the adjacent vegetation 20-30% of
the prostrate trunks could be ascribed to this event (Ogden, in
prep.).   It may be noted that the area of forest showing disturbance
is considerably greater on Walker's 1972 map than the equivalent as
mapped by Fosberg in 1961.

Noddies may favour this more disturbed *Pisonia* forest (Table 2),
although the significance of the difference between the estimates for
the two stands cannot be assessed.   The slightly higher density of
noddies in this forest type is emphasised by expressing it on a per-
unit-tree-basal-area scale, and further by considering the different
canopy heights in the two stands.   The total *Pisonia* biomass is a
function of basal area and tree height, so that the results indicate
considerably more noddies per unit *Pisonia* biomass in the disturbed
forest.

TABLE 1

Vegetation characteristics of the two stands. All figures
expressed on a per hectare basis. Basal area is obtained
by summation of the cross-sectional areas of all stems > 1cm
diameter, and is taken as an index of plant biomass.

Character	Stand 1	Stand 2
Vegetation type	1A	1C
Total density *Pisonia* stems > 1cm diameter	3280	2340
Total density all stems > 1cm diameter	3570	2850
Density of *Pisonia* "clumps"	210	220
Density of *Pisonia* stems > 30cm diameter	300	300
Total basal area of *Pisonia* stems (m²)	93.0	74.5
Total basal area all stems (m²)	94.1	79.1
Basal area (and densities) of subsidiary tree species:		
Ficus	0.9 (180)	2.2 (200)
Pipturus	0.1 (10)	1.1 (80)
Celtis	0.06 (90)	0.02 (30)
Pandanus	0.007 (10)	1.24 (200)
Subtotal: all trees other than *Pisonia*	1.1 (290)	4.6 (510)
Estimated canopy height (m) and condition	14–17 (+closed)	10–12 (+open)

TABLE 2

Noddy and Shearwater populations in the two stands.

	Stand 1	Stand 2
Stand area	.1 ha	.1 ha
Noddy nests	341	356
Noddy nests per unit tree basal area	36.2	45.0
Shearwater burrows	95	85

The number of nests per *Pisonia* clump was significantly correlated
with the basal diameter of the clumps (r = .72; n = 23; p < .001)
and with the diameter at 50cm of the largest trunk in the cluster
(r = .64; n = 23; p < .01). However, a plot of the data suggests

to me that the relationship between trunk size and number of nests is curvilinear (Fig. 1). Small and very large trees are both apparently less favoured than those in which the main nesting trunk is 40 to 70cm in diameter and the cluster as a whole is in the range 100 to 250cm in diameter at ground level. Relative avoidance of exceptionally large senile trees by nesting noddies may be related to the high mortality risk of such trees, which are particularly vulnerable to wind-throw. Such trees were almost restricted to Stand 1 and the adjacent forest.

In both stands the majority of nests were between 3 and 12m above the ground, so that the upper part of the canopy was under-utilised in Stand 1. The upper branches of large *Pisonia* trees bear smaller leaves and much more abundant fruit clusters than those lower down, and this could account for noddies avoiding them. Several authors have stressed how noddies assist in the distribution of *Pisonia grandis* because the seeds adhere to their feathers (Ridley, 1930; St John, 1951; Airy Shaw, 1952; Carlquist, 1965). Fledgling noddies however may become so entangled in the sticky fruit clusters that they are killed. An account of a similar happening in the case of *P. brunoniana* (syn. *Heimerliodendron brunonianum*) and *Zosterops* sp. is given by Govett (1883).

Kikkawa (1970) noted that the numbers of noddies appear to have increased on Heron Island since the beginning of this century; in 1910 there were 53 occupied nests; in 1946 "a small colony" and in 1965 a minimum of 8500 pairs. By the 1970's both Kikkawa and Bingham (1977) refer to "tens of thousands". In a personal communication K. Hulsman records his impression that the noddy population size is currently 15-20,000 pairs. Moreover he notes that an increasing population of this species on Heron Island could be consistent with noddies recently starting to lay eggs on One Tree Island.

The results in Table 2 can be averaged and multiplied by the total area of vegetation types 1A and 1C on the island (c. 8ha., from Walker's map) to give a total nest population number of c. 28,000. From Shipway's results it can be postulated that at least 47% of all nests counted were occupied, which gives a minimum estimate of c. 13,000 pairs. However nests were also present, albeit at a lower density in other vegetation types and in *Pisonia* trees within the resort and research station areas. In view of this I suggest a maximum estimate of c. 25,000 pairs. Nests were not present in the resort or research station areas in 1965 (Shipway, 1969) an observation which is in keeping with the increased population size indicated by these results. The increase in area of the favoured *Pisonia* forest since the 1967 cyclone could be in part responsible for this increase, although it appears to be part of a longer-term trend.

All authors describing the nesting of the Black Noddy on Heron Island have stressed its preference for *Pisonia* trees. Gillham (1961) mentions also *Ficus opposita*, and Bingham (1977) adds *Tournefortia argentea*, Shipway (1969) notes that the species does not nest in *Casuarina*, and Bingham (1977) adds *Pandanus* to the list of avoided species. Observations in 1978 showed that, in addition to *Pisonia*, *Ficus* and *Celtis* were quite frequently utilised, *Pandanus*, *Cordia* and *Tournefortia* less commonly, and nests were very rare in *Casuarina*, *Scaevola* and *Pipturus*. However, K. Hulsman (pers. comm.) recorded more than 10 pairs of noddies building nests in *Casuarina* trees near
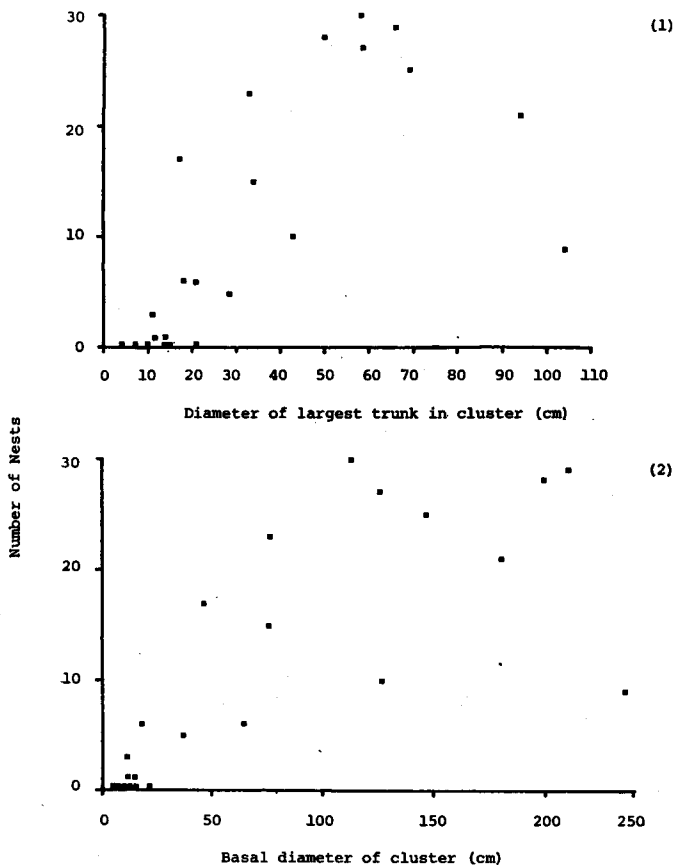
FIGURE 1

Variation in noddy nests per *Pisonia* tree in relation to (1) the
diameter at 50cm height of the largest trunk in the clump, and (2)
the basal diameter of the whole clump. The points represent twenty
three trees from both stands. (Not all trees could be included
because tree measuring and nest counting were carried out on
different occasions and the tree identification number was not
always recorded with the count. Those graphed are a random sample
in which nest counting was repeated as a check on count reliability).

the helipad a few weeks later in the same year. *Scaevola,* *Tournefortia* and *Pipturus,* grow to little over 3m in height and have a relatively dense outer leaf mosaic with few gaps through which birds could enter or leave. The pendulous branches and open foliage of *Casuarina* apparently make this tree quite unsuit-able for nesting.

In 1978 the first shearwaters to arrive at Heron Island probably did so the night of 14 October, about a week later than usual (Moulton, 1961; Kikkawa, 1970; Bingham, 1977). However by late October when the census was made, most existing burrows had been re-occupied. Taking an average figure of 900 shearwater burrows per ha (Table 2) I obtained a total estimate of 7,200 pairs for the two vegetation types. This is certainly an underestimate as nests were abundant in the research and resort areas that comprise almost 1/3 of the island. However, the average density of burrows per m^2 (0.8) in the two stands was almost twice that recorded for the island as a whole by Shipway in 1965. This confirms Gillham's (1961) observation that the shearwaters prefer the closed "climax" forest to the more scrubby vegetation of the coastal fringe. Whether their abundant burrows among the *Pisonia* roots render this forest progressively more susceptible to damage by strong winds presents an intriguing question for the long-term interaction between the trees and their associated avifauna.

I estimate that in November 1978 there were at least 8000 pairs of Wedge-tailed Shearwaters on Heron Island. Thus, there is no indic-ation of a change in the status of this species since Shipway's estimate of 8300 pairs in 1965. It should be noted that the latter estimate was based on counts covering an area equivalent to 6.1% of the total area of the island above high water, whereas my own is based on only c. 1% of the island area.

CONCLUSIONS

1. The Black Noddy has increased in numbers on Heron Island since 1965. This increase appears to be part of a long-term trend.

2. The breeding population size of this species in 1978 was probably between 13,000 and 25,000 pairs.

3. The species prefers *Pisonia* trees for nesting, and preferentially selects those communities dominated by this species which have suffered some disturbance and have a lower, more varied and open canopy.

4. The breeding population of Wedge-tailed Shearwaters was estim-ated at 8000 pairs in 1978. This figure agrees with Shipway's estimate of 8300 pairs in 1965 and suggests that no change in the status of this population has occurred over this time.

ACKNOWLEDGEMENTS

REFERENCES

Airy Shaw, H.K. 1952. On the distribution of *Pisonia grandis* R. Br. (Nyctagin-
      aceae), with special reference to Malaysia. *Kew Bull.*, 1952: 87-97.
Bingham, P. 1977. Birds of Heron Island. *Aust. Bird Watcher*, 7: 99-100.
Bustard, R. 1972. *Australian Sea Turtles. Their Natural History and
      Conservation.* London : Collins pp 220.
Carlquist, S. 1965. *Island Life. A Natural History of the Islands of the World.*
      New York : Natural History Press pp 451.
Fosberg, F.R. 1961. Description of Heron Island. *Atoll Res. Bull.* No. 82 : 1-13.
Gillham, M.E. 1961. Coral cay vegetation, Heron Island, Great Barrier Reef. *Proc.
      Roy. Soc. Qld*, 73: 79-92.
Govett, R.H. 1883. A bird-killing tree. *Proc. Inst. New Zealand*, 16: 364.
Kikkawa, J. 1970. Birds recorded at Heron Island. *Sunbird*, 1: 34-48.
Moulton, J.M. 1961. Some observations on the Heron Island Fauna. *Atoll Res.
      Bull.* No. 82: 15-16.
Ridley, H.N. 1930. *The Dispersal of Plants throughout the World.* Ashford, Kent :
      L. Reeve and Co. pp 744.
Shipway, A.K. 1969. The numbers of terns and shearwaters nesting on Heron Island
      in 1965. *Emu*, 69: 108-109.
St John, H. 1951. The distribution of *Pisonia grandis* (Nyctaginaceae). Pacific
      plant studies No. 10. *Webbia*, 8 (1).
Walker, J. 1972. Heron Island National Park, Monto Forestry District (map).
      1:2000. Survey and Mapping Branch, Dept. of Forestry, Brisbane Govt Printer.

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THE NAMING OF <u>MELIPHAGA NOTATA</u>

N. JACK

People who change vernacular names often cause more disturbance than
those who change scientific names. A review of recent literature
reveals that a well-known inhabitant of the north, long known as the
Lesser Lewin Honeyeater, has gone back to its old name of "Yellow-
spotted Honeyeater".

North (1909) used the name "Yellow-spot Honeyeater", then *Ptilotis
notata*. North's opinion was that the name "Yellow-spotted" suggested
a bird well endowed with yellow spots, whereas *Meliphaga notata* is
rather uniformly coloured with only two yellow spots, one on each
cheek.

However the name "Yellow spotted" persisted well into the early
twenties. Barnard (1927) used this name to describe the bird.
Suddenly it turned up in the 1916 RAOU Checklist as the "Lesser Lewin".
Many field observers used the more convenient term "Little Lewin".

Some of the earlier ornithologists had difficulty in distinguishing
this species from the Lewin Honeyeater *Meliphaga lewini*. It was

thought at one stage to be a smaller edition of the Lewin, conform-
ing to an oft-quoted taxonomic rule that bird species get smaller
as they reach the warmer part of their range. Barnard (1926) stated
that in 1916, in company with A.J. Campbell, he obtained the skins
of both species *notata* on the coast and *lewini* on the range, and that
neither Mr. Campbell nor Mr. H.L. White, who compared the skins, were
able to separate them. Barnard (1926)   added that, as the notes of
the two birds were totally different, "I held to my contention that
there was a difference in the two honeyeaters".

Possibly some of the early ornighologists suffered deafness, or did
not think the study of bird calls was of any importance in distinguish-
ing bird species. Eventually the Graceful Honeyeater *Meliphaga*
gracilis was introduced into the argument, creating an awesome trio
to confuse the traveller to the north.

To a person with normal hearing the calls of the three species are
quite distinct. Barnard apparently had good hearing, and he was a
skilled onserver, and his opinions proved to be right. Mathews, who
was not popular with most ornighologists because of his so-called
"splitting" habits, had no hesitation in placing the Yellow-spotted
Honeyeater in a genus of its own *Ptilotina analoga* in 1913.

In the field the Yellow-spotted Honeyeater has quite an identity.
It is fearless and aggressive with more than its share of that so
called "cheekiness" usually associated with some of the honeyeaters.
It ranges from New Guinea down the east coast of Queensland with a
stronghold at Cardwell, and straggles down to Townsville (Lavery and
Hopkins, 1963), and according to Crome (1976) south to Mackay. It
may have a broken distribution along this line.

The story goes back to the 1920's and involves E.J. Banfield (*"The*
Beachcomber"), A.H. Chisholm, and a "cheeky" honeyeater that inhabit-
ed Dunk Island. When Chisholm visited Dunk Island in 1921 he came to
know the enterprising bird quite well under the familiar name of
"Jacky". Chisholm states that it was quite a member of the Banfield
family. Having a particular fancy for ripe bananas it would fly
frequently into a shed adjoining the kitchen and help itself. And
what a protest arose if the door chanced to be closed; then the
placid air of the island would be rent by the indignant shrilling of
the bird. Later Chisholm took a specimen in hand on the mainland, a
few miles north of Cardwell, by lifting a sitting bird off its nest.
Measurements and colour notes were secured. He further writes that,
when returning to Brisbane with a description of the bird and fixing
its identity, he notified Banfield on the point, but Banfield was only
politely interested. "So," he wrote "our Jacky is officially known as
Ptilotis notata; we shall still call him "Jacky".

REFERENCES

Barnard, H.J. 1926. Birds of the Cardwell district, Queensland. *Emu* 26: 1-3.
Crome, F. 1976. Yellow-spotted Honeyeater. In: *Complete Book of Australian*
    Birds, (H.J. Frith consul. ed.) p. 474. Sydney:: Readers Digest.
Lavery, H.J. and Hopkins, N. 1963. Birds of Townsville district of North Queens-
    land. *Emu* 63: 242-252.
North, A.J. 1909. *Nests and eggs of birds found breeding in Australia and*
    Tasmania. Sydney : White.

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TRANSIT PARTY SIZE IN <u>TRICHOGLOSSUS</u>
(AVES:LORIIDAE) AT CORINDA, QUEENSLAND.

I.N. WALTERS

SUMMARY

Party sizes of transient *Trichoglossus* were recorded
during six months at an urban location. Mean party
sizes for *T. haematodus*, *T. chlorolepidotus*, and
indeterminate *Trichoglossus* were 2.00, 2.62, and
3.22 respectively, whereas median and modal scores
for all groups revealed values of 1. It is concluded
that the pair was the basic social entity in observed
transit parties, and implications of this are discussed.

INTRODUCTION

Forshaw (1978:64) reported that the Rainbow Lorikeet *Trichoglossus
haematodus* was "generally observed in pairs or in flocks of from a
few birds to hundreds, depending on the abundance of flowering
trees". He also said that the Scaly-breasted Lorikeet
T. chlorolepidotus was "usually seen in flocks" (Forshaw, 1978:68).
Bell (1966) observed Rainbow Lorikeets at Port Moresby in December
1964 in parties of six to ten birds and these gradually built up
to at least 150 birds later in the day. He also noted mixed
assemblages of feeding birds in which there were "several individ-
ual Rainbow Lorikeets" (Bell, 1968:222). In the Giru district of
North Queensland in May 1969 Lavery and Blackman (1970:785) saw
feeding flocks which consisted of "approximately 1,000 rainbow
lorikeets and 500 scaly-breasted lorikeets", and roosting flocks
"of some 20 birds".

These reports reveal considerable variety in the size of groups of
individuals belonging to these two species. But relatively little
quantitative information appears to be available. This paper seeks
to quantify party size in transient *Trichoglossus* during a short-
time study at a single urban location. It is possible that any
structure revealed for small groups or parties could point up a
general basic social entity for larger flocks seen under similar
conditions.

STUDY AREA AND METHODS

A locale which contained no (or few) lorikeet feeding and roosting
stations was sought. This was intended to maximize chances that
the birds would not occur in large flocks, for it seems there is
a tendency for round numbers to be used when estimating the size
of large flocks (cf. Bell, 1966; Lavery and Blackman, 1970). The
area containing and surrounding the railway shunting yard at Corinda,
Queensland, was chosen as such a place.

Most recordings were completed from an open, elevated, east-facing
patio, but other records were obtained during walks about the area.
Binoculars (8x30) were used whenever possible. For all transient
Trichoglossus, attempts were made to record species, numbers of

individuals, direction of flight path, estimated altitude, date, and
time of day. All observations were undertaken during the period
June–November 1978.

Arbitrarily party definition required a ≤50m spread of birds in any
direction, with all birds travelling on the same flight path.
Weather conditions, glare, and direct morning sunlight combined with
observer inadequacy to hamper identification at the species level.

RESULTS

Two hundred and sixty-one parties were recorded. Only two of these
were identifiable as Rainbow Lorikeets, and twenty-six as Scaly-
breasted Lorikeets. The remaining two hundred and thirty-three
parties were known to be either *T. haematodus* or *T. chlorolepidotus*
or mixed parties of these two species, and were termed indeterminate.
Numbers of parties seen, party size ranges, and statistics for
central tendency and dispersion are presented in Table 1. The mean
as a statistic tends to be influenced by a small number of large
values if these are present. They were in these data. Two other
measures of central tendency were therefore deemed more applicable:
median and mode. These both revealed values of 2 for all groups.

TABLE 1

Transit party size for Rainbow, Scaly-breasted, and indeterminate
Lorikeets at Corinda.

	Rainbow	Scaly-breasted	Indet.
Number of parties observed	2	26	233
Range of party size	2 – 2	1 – 8	1 – 12
Mean	2.00	2.62	3.22
Standard deviation	–	1.55	2.36
Median	2	2	2
Mode	2	2	2

The times of day when parties were encountered depended upon
observer availability. No increase in party size later in the day
was observed (cf. Bell, 1966). There appeared to be no preferred
or most commonly used flight path. All observations were of parties
flying at altitude ≤50m.

DISCUSSION

Lavery and Blackman (1970:785) and C. Cannon (pers. comm.) noted
that the two species were mostly segregated when occurring in the
same vicinity. So perhaps the present indeterminate parties were
actually either *T. haematodus* or *T. chlorolepidotus* rather than
mixed parties, with the findings then being relevant to both species.
These data point up the pair as the basic social entity in transit
parties, and admit speculation that this is the case for larger

transient flocks.   However further work needs to be done with pos-
itively identified specific groups.

Hamley (1977) claimed that the pair in *T. chlorolepidotus* function-
ed as a viable territorial unit for defence of an immediate food
source.   This phenomenon could explain pair-based transit parties
within both of these *Trichoglossus* species.   The pair would be the
entity most suitable to successfully find and eat food in the face
of competition.   Such success may then be accompanied by the
tendency for those birds to remain in pairs and/or pair-based
parties and flocks in transit from one food source to the next.

ACKNOWLEDGEMENT

REFERENCES

Bell, H.L. 1966.   Some feeding habits of the Rainbow Lorikeet.   *Emu* 66: 71-72.
Bell, H.L. 1968.   A further note on the feeding of lorikeets.   *Emu* 68: 221-222.
Forshaw, J.M. 1978.   *Parrots of the World.*   (2nd rev. edition) Melbourne :
    Lansdowne.
Hamley, T. 1977.   Feeding behaviour of Scaly-breasted Lorikeets.   *Sunbird* 8:
    37-40.
Lavery, H.J. and Blackman, J.G. 1970.   Sorghum damage by lorikeets.   *Qld.
    Agric. J.* 96: 785-786.

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BOTAURUS POICILOPTILUS AND THE "OVERLUMP" SYNDROME

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Over the past four decades the lumping of seemingly closely
related allopatric forms has become quite fashionable. The Austral-
asian region has had its fair share of attention but it is gradually
becoming apparent that some of the lumpings were hastily made with-
out due consideration and weighing of all the characters by which
the replacement taxa differed.

Sometimes the birds themselves have drawn attention to their plight
with the discovery that the ranges of the "replacement" taxa were
actually sympatric in part. Among examples of this might be cited
Podiceps ruficollis and *P. novaehollandiae* (RAOU, 1926; Rand, 1942;
Mayr, 1943, 1945) *Turnix sylvatica* and *T. maculosa* (Mayr, 1949;
Sutter, 1955) and *Acrocephalus arundinaceus* and *A. stentoreus* (Mayr,
1941; Vaurie, 1956) though the taxa involved in the last mentioned
case in my opinion still require a thorough review. As mentioned
above, there is also the ever present likelihood that a reviser will
simply fail to note all the characters which may distinguish the
allopatric forms. For a prime example of this, which concerns
Australasian species, viz. *Sterna hybrida* and *S. albostriata* see
Mees (1977). There are at the extreme end armchair taxonomists who
lump (or split) species when their material consists only of an
inadequate illustration in a reference book.

In case it might be thought that I am solely critical of amateur
taxonomists I hasten to point out that professional taxonomists can
at times let down their guards. The RAOU Checklist written by H.T.
Condon (1975) and edited by S. Marchant, under *Anhinga melanogaster*
contains the statement "that Australian birds are virtually indis-
tinguishable from subspecies *rufa* from Africa". On these grounds
Condon places the Australian form *novaehollandiae* as a synonym of
rufa despite the fact that the plumage differences between these two
forms have been well known for a long time (e.g., Ogilvie-Grant,
1898). Contra van Tets (in Condon, 1975) I prefer to follow the
opinion of Vaurie (1965) who thought it was best not to combine *rufa,
novaehollandiae, melanogaster* and *anhinga* at the species level.

It must be realized at times with allopatric forms that it is diffi-
cult to so evaluate morphological characters that one can confidently
predict what might happen if two allopatric species became sympatric.

Recent discussion among Australian ornithologists regarding the
placing of *B. poiciloptilus* as a race of *B. stellaris* following the
New Zealand example (O.S.N.S., 1953) fortunately did not reach the
formal level. Because the proposal was considered, it seems worth-
while to mention some of the characters by which these forms may be
distinguished.

In size there is little difference, however the tarsus of *B.
poiciloptilus* was rather stouter when mature specimens of the same
sex were compared. The rectrices of *B. stellaris* are ochraceous
and strongly barred dark brown whereas those of *B. poiciloptilus*
are plain dark brown, sometimes edged with buff. Precisely the same
differences in pattern are to be found in the remiges. The mantle

of *B. poiciloptilus* is much darker owing to the lesser amount of buff-yellow edging to the feathers. Juvenile *B. poiciloptilus*, however, have larger amounts of buff-yellow edging and their mantle pattern approaches that of adult *B. stellaris*. The dark brown of the crown in *B. poiciloptilus* continues down the neck and onto the well-developed ruff. *B. stellaris* has a sharply defined blackish cap on the crown and the ruff is not as well-developed and is buff-yellow with fine brown barrings. In summary, although at first glance *B. stellaris* and *B. poiciloptilus* may appear superficially alike, there are a number of consistent differences in colour pattern that may be used to separate them.

ACKNOWLEDGEMENTS

REFERENCES

Condon, H.T. 1975. *"Checklist of the Birds of Australia" Part I Non-passerines"*. Melbourne : RAOU.

Mayr, E. 1941. *List of New Guinea birds*. New York : Am. Mus. Nat. Hist.

Mayr, E. 1943. Notes of Australian Birds II. *Emu* 43: 3-17.

Mayr, E. 1945. The Downy Plumage of the Australian Dabchick. *Emu* 44: 231-233.

Mayr, E. 1949. Notes on the Birds of Northern Melanesia. *Am. Mus. Novit.* 1417: 1-38.

Mees, G.F. 1977. The subspecies of *Chlidonias hybridus* (Pallas), their breeding distribution and migration (Aves, Laridae, Sterninae). *Zool. Verh.* 157: 1-64.

O.S.N.Z. Checklist Committee. 1953. *Checklist of New Zealand Birds*. Wellington : O.S.N.Z.

Ogilivie-Grant, W.R. 1898. Order XVII Steganopodes. *Catalogue of Birds in the British Museum* 26: 329-484.

Rand, A.L. 1942. Results of the Archbold Expeditions No. 43. Birds of the 1938-1939 New Guinea Expedition. *Bull. Am. Mus. Nat. Hist.* 79: 425-516.

R.A.O.U. Checklist Committee. 1926. *Official Checklist of the Birds of Australia*. Melbourne : R.A.O.U.

Sutter, E. 1955. Über die Mauser einiger Laufhühnchen und die Rassen von *Turnix maculosa* und *sylvatica* im indo-australischem Gebiet. *Naturforschende Gesellschaft, Basel. Verhandlungen* 66: 85-139.

Vaurie, C. 1956. *The Birds of the Palearctic Fauna, Passeriformes*. London : Witherby.

Vaurie, C. 1965. *The Birds of the Palearctic Fauna, Non-passeriformes*. London : Witherby.

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DISPLAY OF THE GREAT-BILLED HERON

ARDEA SUMATRANA

H.B. GILL

According to Hancock and Elliott (1978) nothing is known of the courtship of the Great-billed Heron *Ardea sumatrana*.

Early in the morning of 12 September 1967, at Katherine Gorge, Northern Territory, my attention was drawn to a large grey bird flying to a thicket of *Pandanus* along the river. A few minutes later, two Great-billed Herons appeared, performing what seemed to be a courtship display in a small clearing within the thicket. Their short tails were fanned and for most of the time cocked, the hackles along their necks were puffed out, the head feathers were raised in a crest, and their wings were stiffly drooped, touching the ground in the manner of a parading domestic turkey *Meleagris gallopavo*. One of the birds was continually making a noise like a small engine, and although it sounded as though it was antiphonal, only one bird's bill and throat showed any movement; the other seemed to remain quite silent.

During this performance, they both strutted around, bowing to each other, and dancing a few steps now and again. The display lasted perhaps five minutes, then one of the birds suddenly closed all of its feathers and ran out along a log over the stream, looking unruffled and small in comparison with its puffed up appearance and continual movement of minutes before. The other bird, which had withdrawn from sight, still continued the loud calling which sounded rather crake-like but far louder.

The bird on the log then flew up onto a high horizontal branch over the stream where it preened for ten minutes before flying away out of sight. At this stage, the calling of the second bird gradually lost intensity and volume until it disappeared, and the bird was not seen again.

REFERENCE

Hancock, J. and Elliott, H. 1978. *The Herons of the World.* New York : Harper and Row.

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A FEEDING ASSOCIATION BETWEEN AUSTRALIAN
FERNWREN AND ORANGED-FOOTED SCRUBFOWL

A.I.G. LINDSEY

On 12 November 1977 I visited the Crater National Park on the Atherton Tableland in northern Queensland. In the rainforest I came upon an Orange-footed Scrubfowl *Megapodius reinwardt* foraging in deep leaf litter and accompanied by an Australian Fernwren *Crateroscelis gutturalis*. I watched the two birds together for about ten minutes before they moved deeper into the forest where I was able to follow them further.

The Fernwren remained about a third of a metre behind the Scrub-fowl, and I watched it take and swallow three items of food, each time from substrate actually disturbed by the larger bird. At one point the Scrubfowl foraged in one spot for several minutes, prod-ucing a distinct crater in the leaf litter before moving off to resume foraging about three metres further on. The Fernwren entered this depression where it caught and swallowed another item of food. It then fluttered over and rejoined the Scrubfowl, again positioning itself about thirty centimetres behind the other bird. The two birds remained in this association until I lost sight of them a few minutes later.

The Fernwren appeared to be taking advantage of the larger bird's superior ability to dig deeply into the litter, presumably to obtain food items overlooked or rejected in the normal foraging of the Scrubfowl.

Except for de Vis' somewhat ambiguous remark concerning a Fernwren "feeding on the ground ... in company with *Orthonyx spaldingi* (sic)" (1899, Proc. Royal Soc. Qld. 6:244), I have been unable to locate any other report of this species deliberately following larger birds to obtain food.

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BREEDING RECORD OF THE MOUNTAIN DUCK
FROM QUEENSLAND

W.A. BOLES and K.A. MULLER

The Mountain Duck *Tadorna tadornoides* is regarded as a rare vagrant
to Queensland. Most distribution maps, including that in Frith
(1967) show Queensland well outside the range of this species. Storr
(1973) cites two records and Horton (1976:100) mentions that it has
been seen in the Mount Isa district "on two or three occasions". An
unpublished report is from Lake Muncoonie 100km north-west of Birds-
ville, Queensland on 15 August 1974 (B.W. Finch, pers. comm.).
During a visit to Lake Muncoonie on 20 September 1977, while
observing the birdlife of the lake by boat in the company of A. Read
and T. Nicholls, we encountered a male and female Mountain Duck with
two large downy young. As we tried to move closer, the adults took
flight. The ducklings, although quite incapable of flight, dived
expertly and could not be approached closely.

As the young birds could not fly, they had obviously been bred at the
lake. K. Muller, who has had experience breeding these birds in
captivity, confirmed the identification of the chicks and estimated
their ages at 3-4 weeks. This constitutes the first breeding record
of this species from Queensland.

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his boat and his efforts in transporting us. An anonymous referee
pointed out the reference by Horton.

REFERENCES

Frith, H.J. 1967. *Waterfowl in Australia*. Sydney : Angus and Robertson.
Horton, H. 1976. *Around Mount Isa*. Brisbane : UQP.
Storr, G. 1973. List of Queensland Birds. *Spec. Publ. West. Aust. Mus. No. 5.*

MR. W.E. BOLES, *The Australian Museum, College Street, Sydney, N.S.W., 2000.*
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