

FRUITS AND SEEDS FROM FAECES OF DWARF CASSOWARY
CASUARIUS BENNETTI FROM 3260 M ON ENGLISH PEAKS,
PAPUA NEW GUINEA

HELEN FORTUNE HOPKINS

INTRODUCTION

In response to Andrew Mack's request for information on the biology of cassowaries (Mack 1990) I analysed two faecal samples from Lake Omha, English Peaks, in Oro Province, Papua New Guinea (c. 8° 45'S, 147° 29'E, PNG Topographic Survey 1:100,000 Sheet 8380). The samples were collected during short field trips to a site at 3620 m in the Owen Stanley Mountains, where Beehler and co-workers have been studying the feeding biology of Macgregor's Bird of Paradise.

Cassowaries are large, flightless birds whose diet consists almost exclusively of fruits (Crome 1975; Mack 1990; Pratt 1983; Stocker & Irvine 1983). Three species occur in Papua New Guinea but only the Dwarf Cassowary occurs at such a high elevation (Beehler *et al.* 1986).

The faecal samples were lumps of semi-digested plant material in which seeds and partially digested fruits were clearly visible, and there was only a small amount of leaf material. One of the lumps measured 8 x 6 cm, and thus was unlikely to be the droppings of any other animal.

The vegetation at this altitude is a mosaic of forest and subalpine grassland. The forest canopy at c. 10 m is dominated by the gymnosperm *Dacrycarpus compactus* (Podocarpaceae), which has short, needle-like leaves, and small angiosperm trees including *Rapanea* spp. (Myrsinaceae) are also abundant. The open areas of grasses and sedges, with small herbs and some tree ferns (*Cyathea* spp.), have patches of dwarf woody shrubs, such as *Eurya brassii*, *Coprosma divergens*, and *Styphelia suaveolens*, up to c. 30 cm high. Around the forest edge are numerous shrubs such as *Dimorphanthera macbainii* and *D. amplifolium*, *Symplocos cochinchinensis*, *Decatoca spenseri*, and *Rhododendron* spp. from c. 1-3 m high. Many of the small woody plants have small fleshy fruits that are attractive to small frugivorous birds. Vegetation and flora of this type are described and illustrated by Coode & Stevens (1972).

METHODS

Sample 1 was collected by M.J.G. Hopkins from open grassland in April 1988, and was in two lumps which were analysed together. Sample 2 was collected by Keith Harris from forest edge in Oct-Nov 1988.

The samples were air-dried in Port Moresby and weighed. They were then softened by boiling for about one hour. Fruits and seeds were identified by comparison with a reference collection from the study site, for which herbarium vouchers are deposited at UPNG, and with descriptions and illustrations given in van Royen (1979-1983).

RESULTS

Sample 1 contained the remains of the fruits of at least 8 species of plants, while sample 2 was composed almost entirely of a single species (Table 1). A selection of the fruits and seeds are illustrated in Figure 1. For some species, such as *Rapanea*, with a single hard stone, the number given is likely to be fairly accurate. For others, such as Myrtaceae?, where soft, sometimes empty pericarps with a persistent calyx were counted, the figure may be an underestimate.

There was a considerable range in the degree of digestion both within and between species. In sample 1, for instance, much of the pulp of *Amaracarpus* was at least semi-digested, whereas most of the *Dacrycarpus* fruits were whole and very hard. In sample 2, some of the *Rapanea* seeds were completely exposed but there was a minority of intact fruits as well.

Other plant material consisted of fragments of large leaves and small whole leaves of angiosperms (*Dimorphanthera*, *Styphelia*, Myrtaceae?, grass), two gymnosperms (*Dacrycarpus*, *Papuacedrus*), bryophytes, and some species of lichen. Some of the leaf material might have been merely adhering to the outside of the sample, but some was embedded in pulp, and presumably ingested with fruits picked up from the forest floor.

The insect remains included two small entire beetles, the mouthparts of two large beetles, a small entire wing (fly?), and an abdomen segment from a large beetle. They constituted only a minute fraction of the samples.

Mammalian fur in sample 1 contained hairs up to 3.2 cm long, but there was no sign of any bones.

Notes on fruits and seeds:

Sample 1

a) The 'fruit' of *Dacrycarpus compactus* is strictly speaking a fleshy cone. They covered a range in size from very small (i.e. immature) to full-sized. Most were whole and still very hard.

b) *Dimorphanthera* consisted of whole fruits, probably immature. Two species are common in the study area.

c) *Rapanea* fruits and seeds covered a range in size, perhaps representing more than one species. At least 3 spp. occur in the study area.

d) Myrtaceae? Superficially these fruits resembled dried currants. They had developed from an inferior ovary with 4 or 5 persistent calyx lobes, frequently with a persistent style, and numerous filaments. Since they had been soft and fleshy, their internal structure was difficult to determine. More than one species may perhaps be included.

e) *Prunus costata*, one almost whole fruit and 3 seeds were present.

f) *Amaracarpus* has distinctive seeds which resemble coffee beans with the parchment intact. Most seeds had pulp still adhering. More than one species occurs in the study area.

g) Rutaceae, probably *Evodiella*. The pericarp resembled that of dried orange. This family is not represented in herbarium collection from the study area.

h) Indet A. The material was woody, but appears to have the remains of a calyx at one end though no seeds were visible. Perhaps a fruit of *Symplocos cochinchinensis*.

Sample 2

The sample had a strong resinous smell.

a) *Rapanea involucrata* is the only species of *Rapanea* with large enough fruits that occurs at this altitude, according to Sleumer (1986), and its type locality is Mt Scratchley. Fruits covered a range in size, but none were as small as some from sample 1, so perhaps all were from this one species.

DISCUSSION

While no generalisations can be made on the basis of two samples, their contents are of interest because they come from the upper altitudinal limit for the Dwarf Cassowary, and the vegetation has a very different species composition from the localities in montane forest where its diet has been studied in detail (Mack, 1990; Pratt, 1983).

The contents of these two samples are consistent with the findings of Lamothe *et al.* (in press), Mack (1990) and Pratt (1983) for *C. bennetti*, and Crome (1975) and Stocker & Irvine (1983) for *C. casuarius* in that:

a) the fruits of relatively few species are present in any sample;

b) the pulp of some fruits is partially digested, but other fruits are whole, suggesting a relatively rapid passage time through the gut;

c) many seeds are passed whole, only the pulp is digested, so that cassowaries are likely to be dispersal agents rather than seed predators in most instances;

d) most of the fruits taken must have fallen from the canopy (e.g., *Dacrycarpus*, *Rapanea*, *Prunus costata*), although *Amaracarpus* is an understory shrub or creeping herb, so the fruits could have been picked directly from the plant;

e) insects, mammals, and other plant material are ingested but in very small quantities.

Pratt (1983) found that it was predominantly the large fruits from his study area that were attractive to *C. bennetti*, i.e., those with a diameter greater than 15 mm, and up to 65 mm, although a few in the size class 8.8-15 mm were also taken. At 3620 m in the Owen Stanleys, no species has a fruit greater than c.15 mm.

Stocker & Irvine (1983) and Lamothe *et al.* (in press) have demonstrated that seeds passed through the gut of a cassowary are still viable, and thus cassowaries are likely to be effective dispersers. For the seeds of some species, passage through the gut of *C. bennetti* significantly enhances germination compared with intact fruit (Lamothe *et al.*, in press).

Local information from near Mendi in Southern Highlands Province suggests that Podocarpaceae seeds will only germinate if they have passed through the gut of a cassowary (Lamothe & Arentz pers. comm.). Unfortunately the handling of the samples from English Peaks precluded investigation of the germination capacity of seeds but Dwarf Cassowaries should clearly be considered part of the guild of frugivores which may contribute to seed dispersal in subalpine forest.

Acknowledgements

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Table 1. Analysis on numbers and sizes of fruits and seeds found in two Dwarf Cassowary dung samples (s1 and s2), with habitat of plant species where known. Dimensions in mm. (+ = present, - = absent)

	#fruits		dimensions		#seeds /fruit	habitat
	s1	s2	fruit	seed		
Podocarpaceae						
<i>Dacrycarpus compactus</i>	18	-	12x9.5	8.5x6	one	forest
Ericaceae						
<i>Dimorphanthera</i>	5	-	5.5x5	minute	many	forest edge
Myrsinaceae						
<i>Rapanea</i> sp.	119	-	-	4.5x5 - 7x8	one	forest
<i>Rapanea involucreta</i>	-	472	10x8	5.5x4 - 9x6.5	one	forest
Myrtaceae?	182	-	6x8	?	?	-
Rosaceae						
<i>Prunus costata</i>	4	-	8x8	5x6	one	forest
Rubiaceae						
<i>Amaracarpus</i>	183	0.5	10x7.5	8x5	two	forest understory
Rutaceae	16	-	10x7.5		?4	forest
Indet A	7	-	13x6		?	?
fur	+	-				
insects	+	+				
leaf material	+	+				
Bryophyte	+	+				
Lichen	+	-				
dry weight	56 g	60 g				

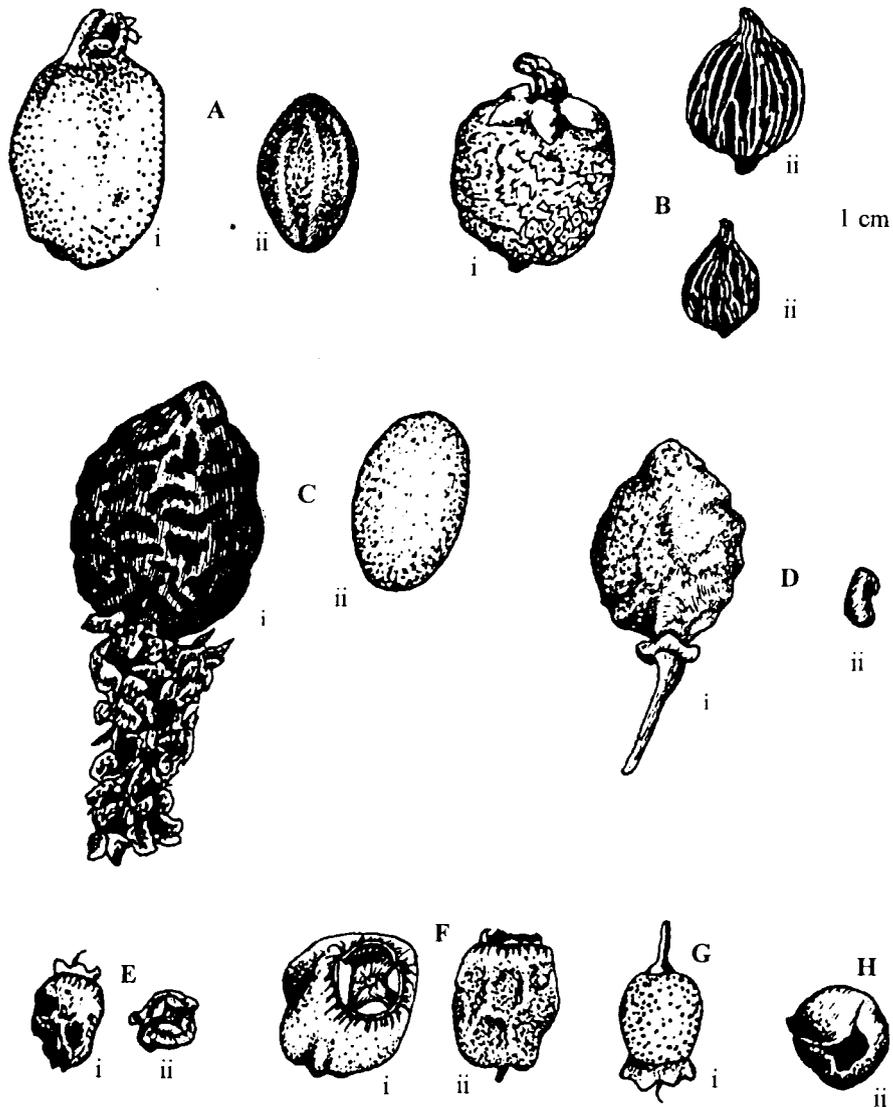


Figure 1. Fruits and seeds from faeces of Dwarf Cassowary.

A: *Amaracarpus*; B: *Rapanea*; C: *Dacrycarpus compactus*; D: Rutaceae;
E & F: Myrtaceae?; G: *Dimorphanthera*; H: *Prunus costata* (seed only)

i: fruit ii: seed

OBSERVATIONS OF BIRDS FEEDING AT A FLOWERING *SYZYGium*

ROGER K. HICKS

On 5 September 1987 I found a *Syzygium* sp. (Myrtaceae) tree in flower beside the boundary trail in Varirata National Park (Central Province) at c. 750m. The tree was c. 30 m tall and had a large spreading canopy. It stood on the bank of the stream, in the bottom of a steep-sided, relatively narrow valley. The flowers occurred in clusters growing directly from the sides, not at the ends of the branches, and did not grow from smaller twigs. The clusters consisted of many stalks, almost mistletoe-like, with each stalk supporting a flower. These clusters were about 15 cm in diameter. The stalks on which the flowers grew were quite woody and would support a bird the size of a Helmeted Friarbird *Philemon bucceroides*.

Between 5 and 20 September 1987 I visited the tree four times and watched for a total of 520 minutes (5 September 15:00 - 16:45; 12 September 07:45 - 08:10; 13 September 08:45 - 11:30 and 20 September 07:00 - 10:45). The shortest observation period was 25 minutes and the longest 225 minutes. There were many fewer flowers on 20 September, the last visit, than on the first, although I cannot quantify this. I observed the tree from a convenient point on the ground, from where 70% of the canopy was visible. Although the tree was in leaf, the foliage was sparse and it was only the crown of a smaller tree that obscured my view.

Nine species, six honeyeaters (plus one unidentified meliphaga) and two lorries were observed feeding at the flowers of this *Syzygium* tree. Feeding birds were present in the tree for 85% of the observation time, which included all of the first three observation periods. Only during the final observation period, when there were fewer flowers, were there times when there were no birds feeding in the tree.

Between one and four Helmeted Friarbirds were present throughout the first three observation periods. On 20 September two birds made only a brief visit to the tree to feed. Helmeted Friarbirds were present in the tree for 57% of the observation period and during this time at least one bird was feeding at a flower-cluster. While in the tree, the friarbirds moved from flower-cluster to flower-cluster by hopping along the branches or flying from branch to branch. When feeding the friarbirds perched by, or on the flower-cluster, using their long necks and bills to reach the more inaccessible flowers. Although there were many flowers on each cluster, the friarbirds fed from only a few before moving on to the next cluster, so the time spent on each cluster was short, usually less than two minutes. Even when four friarbirds were in the tree together no intraspecific aggression was noticed, although the birds seemed to keep in pairs. When a single bird was alone in the tree it called almost continuously.

Greater Streaked Lories *Chalcopsitta scintillata* were not recorded on the first visit but were seen on the subsequent three visits. Between two to eight birds (one to four pairs) were noted. They were present in the tree for 19% of the observation time. On approaching and leaving the tree the birds were noisy but were mostly quiet while feeding. They moved from flower-cluster to flower-cluster by walking along the branches. On the flower-clusters they moved acrobatically from flower to flower, hanging upside down to reach the more inaccessible ones. They did not appear to damage the flowers, i.e., they were not flower predators. No intraspecific aggression was noted and although competing for the same resource no interspecific aggression with the friarbirds was recorded.

Western Black-capped Lories *Lorius lory* were present in the tree for 35 minutes (7% of the observation time). Two to four were recorded feeding in the tree. They were not seen in the tree at the same time as the Greater Streaked Lories. As with the Greater Streaked Lories they were mainly quiet while feeding, but noisy when flying to and from the tree. They were also more acrobatic than the Helmeted Friarbirds when feeding at the lower clusters.

The remaining six species, all honeyeaters, which visited the *Syzygium* tree to feed, did so only briefly. Each feeding visit lasted less than a minute, with the birds only feeding at one or two flower clusters as they passed through the tree. These six species made 13 feeding visits to the tree. Three species made five feeding visits on 5 September and four species, plus an unidentified meliphaga made eight feeding visits on 20 September. On 5 September one Tawny-breasted Honeyeater *Xanthotis flaviventer*, two Puff-backed Meliphagas *Meliphaga aruensis*, and one Dwarf Honeyeater *Oedistoma iliophus* passed through the tree with a mixed-species feeding flock. A single Tawny-breasted Honeyeater had also been recorded earlier in the first observation period. On 20 September an unidentified meliphaga and a Red-throated Myzomela *Myzomela eques* were with a party that also included two Helmeted Friarbirds and also fed on the *Syzygium* flowers. One male Papuan Black Myzomela *Myzomela nigrita*, two Mimic Meliphagas *Meliphaga analoga* and two Tawny-breasted Honeyeaters moved through the tree with another mixed-species feeding flock later in the day. No interspecific aggression was noted among the species that made up these flocks. However, despite this, I think the Helmeted Friarbirds had been defending this tree against smaller honeyeaters as none were recorded on 12 and 13 September. Only when the numbers of flowers were much reduced, on 20 September, and the friarbirds were only noted briefly, were the smaller birds recorded more frequently.

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OBSERVATIONS OF BIRDS FEEDING IN A FRUITING FIG *FICUS* SP. IN VARIRATA NATIONAL PARK

NIKLAS WAHLBERG

On 10 and 11 August 1990 I observed and noted birds that fed on the fruits of a large strangler fig *Ficus* sp. (Moraceae). The tree was an emergent from the forest with a wide canopy, between the Circuit and Boundary trails in Varirata National Park, Central Province. My observations were between 06:30 and 08:30 on both days. I recorded 12 species feeding on the fruit. Most activity was recorded between 06:30 and 07:45. Most species visited the tree for between 2-3 minutes, although some fruit-doves stayed for as long as an hour.

The most frequent visitors to the tree were female-plumaged Raggiana Birds of Paradise *Paradisaea raggiana*. I recorded 18 feeding visits in the four hours and only one bird had male plumage (with no plumes). Only once were there two female-plumaged birds in the tree simultaneously. Several different visits were so close together that I think they were different birds. Their visits ranged from 1-6 minutes duration, with an average of c.2 minutes. It is possible that there were two nesting females using the tree as a food source for their young, while the single male was there opportunistically.

Four species of fruit-doves were recorded feeding: Pink-spotted *Ptilinopus perlatus*, Beautiful *P. pulchellus*, Superb *P. superbis* and Orange-bellied *P. iozonus*. Of these, Pink-spotted Fruit-Doves were almost constantly in the tree, with up to three simultaneously. Beautiful Fruit-Doves came in pairs, spending 10-20 minutes feeding. Only one Superb Fruit-Dove, a male, was recorded. A pair of Orange-bellied Fruit-Doves made only one visit, feeding for about 15 minutes. One other pigeon, a Purple-tailed Imperial Pigeon *Ducula rufigaster* stayed in the tree for c.30 minutes.

Two species of cuckoo-shrike were recorded. Boyer's Cuckoo-Shrikes *Coracina boyeri* were recorded seven times, only once staying longer than 2 minutes. They usually came in pairs and fed by snatching fruit on the wing, then perching to swallow. A Stout-billed Cuckoo-Shrike *C. caeruleogrisea* visited once for a period of one minute. It did not feed.

Of the remaining four species, the Helmeted Friarbird *Philemon buceroides* was recorded five times: twice a pair and three times a single bird. They averaged about 5 minutes for each visit. Magnificent Riflebirds *Ptiloris magnificentus* were recorded three times. Once a lone male, once a lone female and once a male and two females which arrived and left together. The lone female fed for seven minutes and the lone male for one minute. The group of three birds spent four minutes in the tree, but only the females were observed feeding. The male of the group was very vocal. Single Hooded Pitohuis *Pitohui dicrous* were recorded three times and never spent more than two minutes feeding in the tree. Male Black Berrypeckers *Melanocharis nigra* were constantly in the tree and fed several times.

This species of strangler fig would appear to be an important food source for several species of birds, though the fruit do not have a high nutritional value (B.M. Beehler pers. comm.).

I believe that with more observation hours more species would have been recorded. Even with only four hours observation time, I believe the tree was used by at least one, possibly two, nesting female Raggiana Birds of Paradise. Raggiana Birds of Paradise were nesting in the park at the time of these observations. The tree was also visited by insectivorous species, though none of the birds that fed on the figs were seen to forage for insects.

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FEEDING BEHAVIOUR OF SACRED KINGFISHER *HALCYON SANCTA*.

ROGER K. HICKS

On 1 July 1990, at Jais Aben Resort, Madang Province, I watched two Sacred Kingfishers feeding. One of the birds had a more prominent white supercilium which allowed me to keep track of each bird, as they were not in view the whole time. My observations lasted from 11:35 to 12:49 (74 minutes) and only ended when both birds were disturbed by a party of people sitting under the tree from which they were hunting.

Both Sacred Kingfishers employed a "sit and wait" approach. They perched on the lower branches of a rain-tree, c. 8-10 m above the ground. They always perched in the shade, although they did not always use the same perch. At times they were within 3 m of each other although there appeared to be no intraspecific aggression. From their perch they dropped at an angle of between 30 and 45 degrees from the vertical. Six forays were to the ground, which was short grass. Two forays, by the same kingfisher, were into the foliage of a bush on the shoreline. Seven forays out of the nine observed resulted in prey being caught.

Sacred Kingfisher "A" was in view for 53 minutes. During this time it made five forays, all to the ground. All were successful although only three of the prey items were seen for long enough for me to identify them. They were a beetle, a small (c. 3 cm long) lizard and a grasshopper. The kingfisher returned to a perch, not necessarily the one from which it had dropped, to consume its prey. Each of the above prey items was banged against a branch a few times and turned around in the bill before being swallowed. The grasshopper and lizard were swallowed head-first. The other two prey items were small and swallowed too quickly for me to see them. On one occasion, when returning to a perch, kingfisher "A" landed near a Willie Wagtail *Rhidipura leucophrys* which chased it to another perch.

Sacred Kingfisher "B" was in view for 36 minutes. During this time it made four forays, two to the ground and two to the foliage of a bush. Only two were successful, one to the ground and one to the bush. On neither occasion could the prey be identified. It handled its prey much as kingfisher "A", returning to a perch, banging the prey against a branch and turning it around in its bill before swallowing.

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BIRD OBSERVATIONS IN LOWLAND MADANG PROVINCE

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INTRODUCTION

From 19 September to 1 December 1989 I was a resident Fellow at the Christensen Research Institute (CRI), 7 km due N of Madang at the Jais Aben Resort (JAR). My primary research was on the ecology of non-breeding terns. However during my CRI Fellowship I had the opportunity to bird watch in many nearby areas of lowland Madang Province. This paper summarises my observations, in a manner that I hope will be useful to future ornithological explorations of this region.

The seabirds were consistently counted during this period, and these more detailed results will be reported elsewhere. For completeness all species are included in the annotated list of this paper, but the status of seabirds is elaborated only for those birds seen from shore.

I found a total of 224 species. Selected observations by other ornithologists are also noted if appropriate data were available to me, but no species not found by me is reported in this paper. I know of many additional species of land-birds that formerly inhabited this region, and I expect that nearly all of them still occur there.

METHODS

Virtually all observations were made by me alone. Although local residents sometimes accompanied or guided me on my initial visit to a site, I almost invariably found more birds and more elusive birds by returning alone after obtaining the necessary permission. Typically this meant arriving at around dawn and slipping into the forest unseen. I believe only one species in Madang Province was shown to me by a local guide that I would have missed seeing by myself (Hook-billed Kingfisher). Undoubtedly, knowledgeable local guides can sometimes prove very helpful (e.g., Joseph Tano at Ambua Lodge, Tari), but few understand the aims of western birders and ornithologists, and I found that most local people disturbed or tried to kill the birds I was trying to observe.

Birds within several kilometres of CRI were mostly observed opportunistically or in the first two or three hours of the morning. The more distant sites (Naru areas, Malpain, Wasab) were usually birded from dawn to mid-day. On some days I entered the forest at dawn and remained there the entire morning, but often I birded the roadsides from dawn until the hot sunny weather decreased bird activity at forest edge and chased me into the forest. Walking/wading up rivers and streams was not very rewarding except for kingfishers. Occasional observations were made during the afternoon and evening hours. Night drives along the North Coast Road and night walks were all disappointing, probably reflecting the sterility

of plantation habitats for most nocturnal birds. The upper Ramu River valley was covered only once, because of the long drive necessary to get there.

My binocular was a Zeiss Dialyt 10x40B close-focus model. For roadside birding, and especially for watching fruiting trees, I relied heavily on my Bausch and Lomb 15-60x60 zoom scope. The mudflat and airport were censused by spotting scope. Other coastal and marine birds were mostly surveyed from a motor skiff, during which I occasionally travelled as far as Karkar Island (without landing) and up to 38 km offshore ENE of CRI.

SITES

As the Christensen Research Institutes was my base, and it or the Jais Aben Resort are likely bases for future workers, I give site directions from CRI. All distances in these directions are road kilometres. A map of these sites is given on page 135.

CHRISTENSEN RESEARCH INSTITUTE and VICINITY. The CRI/JAR grounds are mostly lawn with coconut palms. The roadsides out to the North Coast Road from CRI north to Militat Harbour and thence west to the North Coast Road provide more diverse habitats, albeit mostly quite disturbed ones. Bamboo and tall grass patches, small mangrove edges, and remnant native trees are among the plantations and habitations.

BAITABAG and NOBANOB. Along the North Coast Road either side of the JAR turnoff are extensive areas of tall moist grass. One of the best is by the Baitabag School, 1 km north on the west side of the road. Just north of the school is the road leading uphill to the Baitabag Mission. About 1.5 km south of the turnoff is the road up Mount Hanseman to the Nobanob Mission. Both Baitabag and Nobanob are heavily populated and disturbed, with only very small pockets of "natural" habitats for forest birds. As true forest birds are almost absent, and it is difficult to observe birds in these areas without being followed by large crowds of people, I visited them only five times for a total of eight hours.

ALEXISHAFEN POND. The smaller pond in Alexishafen is good for freshwater birds, but the larger pond across the street never had a single waterbird in my visits. Perhaps it has a very efficient and scary crocodile? Most of the smaller pond was screened from view by tall thick reeds, with only one or two gaps allowing partial viewing. Alexishafen is 9.2 km from CRI, 6.3 km north along the paved North Coast Road. Keep right where the paved road curves left, keep left entering town, and the smaller pond is on the left. I visited five times for a total of four hours. My one dawn visit produced more birds than my four noon visits, but no additional species.

MALPAIN. A very small village 2.5 km up the road to Baiteta. The Baiteta turnoff is at the south side of a bridge about 14 km north of the Alexishafen turnoff on the North Coast Road. Tracks lead into forest patches on both sides of the road just east of Malpain. These

patches retain most of the true forest birds. A large fruiting tree on the S side of the road was good throughout the period. This tree hosted up to 450 fruit-doves and pigeons of nine species, plus other frugivores. My six visits totalled 28 hours.

WASAB. The turnoff for this active logging area is about 37.3 km from CRI, 6.7 km north of The Malolo of Madang on the North Coast Road. On the right side of the Wasab access road at 1.8 km is a side road on which the logging was halted by the local village. Walking this side road was excellent forest-edge birding, but its potential for forest-interior birds seemed limited. The logging continues every day except Sunday, from 0700 to 1700. This activity plus the resulting mud and slash make the logging zone undesirable for bird observation at most times. However, on a Sunday morning after several consecutive dry days one can drive right to the cutting zone and walk right into the newly exposed forest, without any people or disturbance at that time. Despite this I did not see any birds here that were any more accessible than in the undisturbed forest areas, with the exception of a Dwarf Kingfisher that was flying back and forth across the logging road. I totalled 18 hours in four visits.

NARU HILLS. The Madang-Lae road crosses the foothill of the western end of the Finisterre Mountains. About four ridges into the hills from the Madang side, the road crosses the Naru River on a log one-lane bridge at the village of Naru. The high ridgetops on both sides of the Naru River were excellent for roadside birding. The forest south-east of the road on the ridgetop on the Madang side of Naru was the best, least-disturbed forest I visited in lowland Madang Province. The relatively low levels of human disturbance were exemplified by the Northern Cassowary, Vulturine Parrots, Palm Cockatoos, common Blyth's Hornbills, and abundant Sulphur-crested Cockatoos that I found there. The elevation of this ridgetop is 500-600 m. I was directed to this site by the notes of Tony Palliser (1989). I visited seven times and 42 hours.

SOUTH NARU. This is the only area of good flat lowland forest I worked, as the above three sites are all hilly. The forest patches and streams that I visited are 4.3 to 7.5 km south of the Madang-Lae road on a side road that is 7.3 km south-west of the Gogol River bridge, and 35.5 km south-south-west of CRI. Results at South Naru were quite variable, especially within the forest. My 29 hours were spread among five visits.

UTU and BAKU. These sites up the Gogol River Valley were visited once, for five hours during the middle of 21 October. They offer tiny remnants and edges of lowland forest regrowth, with some real forest patches visible on distant hills.

RAMU VALLEY. Part of the upper Ramu River Valley is in a rain shadow of the Finisterre Mountains, so there is an area of savanna and grassland. Although it is relatively small and is partly taken over by large sugar plantations and cattle ranches, it is the only area of these drier habitats in lowland Madang Province. Of course the avifaunas of these habitats are

quite distinct from anything around the wet Madang coast. My one visit was a very long day, with a 0200 awakening, a long drive to arrive at dawn (0550), nine hours of birding and a return to CRI at 1730. Once entering the Ramu Valley floor, the first area is a settled region of former forest. The transition to true savanna is abrupt, and this is followed by open grassland. The Ramu Sugar plantation is as far as I went. All four of these habitats had birds that I did not see in any of the others.

Tab Island. Also called (Big) Pig Island, Tab Island is the outermost of the Madang barrier reef islands. It is uninhabited, but partly gardened. I landed on Tab Island three times (6.5 hours), from a small motor skiff.

Meiro mudflat. The only mudflat in the Madang region is a very small one that has formed at the mouth of the Meiro River about 1 km northwest of the Madang Harbour. Mud is only exposed during the lower half of the tidal cycle; at other times the waters lap into the fringing mangroves. Terns roost on the mud when it is exposed but when the tide floods they shift to the dead trees and limbs grounded on the mudflat. Most waders apparently fly to the Madang Airport (1 km south) when the mud is submerged. I censused the waders on 13 October and 8 November, a total of five hours, and visited briefly for the terns several times.

Madang airport. Apparently the high tide roost site for most waders, the airport is also used by several species (especially plovers and curlews) as a foraging ground at any time. Without having permission to enter the airport grounds, I 'scoped from behind the south fence and checked the adjacent fields. My four visits (13 Oct to 2 Nov) were each of about one hour, and both high and low tides were sampled.

Gogol River mouth. This sandy river mouth was surveyed by motor boat on 11 October and 17 November. It was used by many terns as a day roost.

ANNOTATED SPECIES LIST

This list follows the sequence and nomenclature of 'Birds of New Guinea' (Beehler *et al.* 1986). Occasionally I give my preferred alternative name in parentheses, in some cases because the use of unmodified group names for species can be ambiguous.

Northern Cassowary

Casuaris unappendiculatus

21 Nov, an adult with full head and neck colours walked into view within the best Naru Hills forest. I had been standing quietly in a gully for perhaps 10 mins, watching a mixed flock of passerines. The "muruk" stepped around the shoulder of a small spur of the gully, saw me standing 8 m from it, spun about, and crashed away into the underbrush in apparant terror. Its reaction to me was so quick that it was in view only about 1.5 seconds. This so startled me that for a brief moment my heart froze and I thought that a terrible-looking painted warrior was confronting me, but of course the cassowary's fear was more justified. I estimated that it stood 1.4 m tall.

Tahiti Petrel

Uncommon offshore.

Pterodroma rostrata

Streaked Shearwater

Uncommon offshore.

Calonectris leucomelas

Wedge-tailed Shearwater

Common offshore.

Puffinus pacificus

Flesh-footed Shearwater

Rare offshore.

Puffinus carneipes

Heinroth's Shearwater

Uncommon outside the barrier reef, rare inside the reef.

Puffinus heinrothi

Australasian Grebe

Regular on the Alexishafen Pond, with up to 3 or 4 visible per visit. See next species.

Tachybaptus novaehollandiae

Little Grebe

Regular on the Alexishafen pond, with 1 or 2 visible on most visits. Interestingly, these congeneric grebes were seen together on most visits to this pond. Although all individuals of both species were in alternate plumage, I could see no nests through the tiny viewing gaps in the reeds.

Tachybaptus ruficollis

Lesser Frigatebird

1 or 2 occasionally seen soaring over nearshore waters, especially over tuna/tern feeding frenzies.

Fregata ariel

Little Black Cormorant

12 Oct, at dawn 19 landed in a tree by the Alexishafen Pond. Sometimes 1 was seen on the pond at mid-day. Occasionally 1 flew over the harbour waters by CRI or Madang. 22 Oct, a flock of 16 flew north past CRI.

Phalacrocorax sulcirostris

Little Pied Cormorant

8 arrived at dawn with the above flock of Little Black Cormorants, and 1 or 2 were often on the pond at mid-day.

Phalacrocorax melanoleucos

Brown Booby

Common offshore and uncommon nearer to shore.

Sula leucogaster

Great Egret

At Meiro mudflat 8 to 12 foraged until the water became deep. Up to 2 foraged in the Madang airport grass, and 1 to 3 were seen on the Ramu and Naru rivers.

Egretta alba

Intermediate Egret

16 Oct, 2 foraging in Madang airport grass; 11 Oct, 1 with Great Egrets at Meiro mudflat.

Egretta intermedia

Little Egret

1 or 2 per visit foraged at Meiro mudflat; 17 Oct, 1 at the Gogol River mouth.

Egretta garzetta

- Eastern Reef Egret *Egretta sacra*
Twice a single dark morph flew past CRI over the harbour waters.
- Crested Hawk *Aviceda subcristata*
Wasab (display flights seen), near Utu, and in the Ramu Valley. Reported by others at Naru and Baiteta, so apparently widespread.
- Long-tailed Buzzard *Henicopernis longicauda*
Naru Hills and South Naru. By others at Baiteta.
- Black-winged Kite *Elanus caeruleus*
2 in the Ramu Valley, at trees in grassland/savanna ecotone and canefield edge.
- Black Kite *Milvus migrans*
Common to abundant along roads, especially through opened country. They usually scavenged road-kills, but groups also hunted within the smoke of grassfires. 3 Nov, 66+ soaring over coconut trees across Nagada Harbour from CRI, catching and eating flying insects.
- Whistling Kite *Haliastur spheurnurus*
Uncommon but widespread. Usually single birds
- Brahminy Kite *Haliastur indus*
Common and conspicuous, but not abundant, with 1 to 5 individuals seen on most trips to every site, except the Ramu Valley.
- Spotted Marsh-Harrier *Circus spilonotus*
4 Nov, 1 cruising over ploughed Ramu Sugar canefields.
- Grey Goshawk *Accipiter novaehollandiae*
Fairly often at the sites with real forest.
- Grey-headed Goshawk *Accipiter poiliocephalus*
1 perched at forest edge at Wasab. Reported at Baiteta by John Woinarski.
- Collared Sparrowhawk *Accipiter cirrhocephalus*
This smallest *Accipiter* in New Guinea was the only one seen in the more disturbed areas such as around CRI and Baitabag; also at Malpain and Wasab, but not at either Naru area.
- New Guinea Harpy-Eagle *Harpyopsis novaeguineae*
29 Nov, 1 flushed and heard at Malpain, in disturbed forest north of the road.
- Gurney's Eagle *Aquila gurneyi*
22 Oct, 1 soaring over South Naru forest; 4 Nov, 1 soaring over Ramu Valley grassland. Woinarski reported it at Baiteta.
- Brown Falcon *Falco berigora*
4 Nov, 3 in the Ramu Valley included a pair at the savanna/grassland ecotone and one in a ploughed canefield. 26 Nov, 2 at Wasab. The PNGBS reported it at South Naru.

- Oriental Hobby *Falco severus*
30 Sep, a pair in display flight on the ridge-top west of the Naru River; 3 Nov, 1 flew past Baitabag. Woinarski reported it at Baiteta.
- Spotted Whistling-Duck *Dendrocygna guttata*
Numerous at Alexishafen Pond, with 15 to 45+ seen per visit; 8 Oct, a flock of 3 flew overhead 2 km north of CRI.
- Wandering Whistling-Duck *Dendrocygna arcuata*
26 Sep, 40 on Alexishafen Pond; decreasing numbers thereafter; 12 Nov, none.
- White-headed Shelduck *Tadorna radja*
13 Oct, 3 flushed from the mangroves behind the Meiro mudflat.
- Green Pygmy-Goose *Nettapus pulchellus*
A male-female pair was visible on the Alexishafen Pond on most visits and probably resided there throughout the period. Neither Coates (1985) nor Beehler *et al.* (1986) indicate any records from the northern watershed of New Guinea, but Jared Diamond and Paul Ehrlich recorded it on Alexishafen Pond in 1986.
- Pacific Black Duck *Anas superciliosa*
Small numbers (1 to 3) were seen at many localities including Alexishafen Pond, various rivers, and puddles in the clearcut area of Wasab.
- Common Scrubfowl *Megapodius freycinet*
Common on Tab Island, where I flushed 4 and located 6 mounds in a partial survey. I did not encounter this species on the mainland of Madang Province, but Luis Baptista reported it 2 km northwest of CRI and Woinarski listed it for Baiteta.
- Brown-collared Brush-Turkey *Talegalla jobiensis*
I heard this bird's raucous nasal crowing frequently, almost every time I visited the forest, yet I was never able to see one by any stealth or trickery. There was seldom an hour when I did not hear it at Naru Hills, Malpain, and parts of Wasab, but it was heard less often at South Naru and Utu. I found mounds in the Naru Hills forest, but no brush-turkeys came while I waited nearby.
- Buff-banded Rail *Rallus philippensis*
Easily seen in the early morning crossing the North Coast Road and opening between Baitabag School and the Nobanob road. Rails glimpsed crossing several other roads were probably this species.
- White-Browed Crane *Porzana cinerea*
Common at Alexishafen Pond, up to 10 in a visit. Occasionally seen crossing the North Coast Road at dawn in the same areas as Buff-banded Rail.

- Bush-Hen *Amaurornis olivaceus*
Often heard calling loudly, usually in morning duets, from many areas of tall grass. Seemed especially common between the JAR gate and the Baitabag School, but I only saw them by waiting for calling birds to cross roads at dawn. Also heard at Malpain and along the Madang-Lae Road near South Naru.
- Purple Swamphen *Porphyrio porphyrio*
4 Nov, 2 were alongside the road through the Ramu Valley, in grassland and canefield.
- Comb-crested Jacana *Irediparra gallinacea*
Common at Alexishafen Pond, up to 6 or 8 in a visit. Baptista reported them on the lily pond in Madang.
- Masked Lapwing *Vanellus miles*
4 Nov, 1 group of 44 around a pair of cattle ponds in the Ramu Valley.
- Lesser Golden Plover *Pluvialis dominica*
I prefer to consider this form a full species, as is the current trend. This was the most numerous wader in the Madang area. Counts on the Meiro mudflat were 230 on 13 Oct and 57+ on 8 Nov. During a morning low tide on 2 Nov I counted 70 foraging on the mowed grass of the Madang airport. During the afternoon high tide there were 148, of which about 100 were roosting in a flock and the rest were foraging. Lesser numbers were on the airport during each other visit. The patterns of most waders foraging on Meiro mudflat at low tide but moving onto Madang airport at high tide, but some individuals remaining on the airport through even low tide, held for most of the following wader species. A flock of 13 foraged the short grass around the Baitabag School on 27 Nov.
- Little Ringed Plover *Charadrius dubius*
Resident on all the larger, gravelly rivers (e.g., Naru, Gogol, and Ramu), this plover was frequently flushed from the road at or near bridges or fords, usually at dawn.
- Mongolian Plover *Charadrius mongolus*
Meiro mudflat had 11 and 12+ on my 2 counts. Madang Airport hosted up to at least 8 on a high tide, with fewer present on low tide.
- Large Sand-Plover *Charadrius leschenaultii*
Meiro mudflat counts were 3 and 7, with up to 5 found on the airport on high tide, and usually 2 on low tide. Both sand-plovers consistently occurred together, but this species was always in the minority.
- Eastern Curlew *Numenius madagascariensis*
1 to 3 consistently foraged on Meiro mudflat and Madang airport.

- Whimbrel *Numenius phaeopus*
1 or 2 usually on the mudflat and/or airport. 1 frequently foraging on the lawns of JAR, and singles flew past over the harbour. 14 Oct, 4 roosting on mangrove limbs in the Mis Estuary.
- Little Curlew *Numenius minutus*
13 Oct, 3 or 4 foraged in the short grass of Madang airport; 2 Nov, 1 there. All showed no movement with the tide.
- Grey-tailed Tattler *Tringa brevipes*
Up to 7 on Meiro mudflat. Occasionally seen flying over harbour waters.
- Common Sandpiper *Tringa terek*
1 to 3 on Meiro mudflat. 2 Nov, 2 fed in rain puddles at Madang airport during high tide.
- Black-tailed Godwit *Limosa limosa*
2 Nov, 1 in basic plumage fed in rain puddles on the airport throughout the day.
- Bar-tailed Godwit *Limosa lapponica*
2 Nov, 1 in juvenile plumage fed in rain puddles on the airport throughout the day. Thus, both godwits failed to use the mudflat during low tide.
- Sharp-tailed Sandpiper *Calidris acuminata*
13 Oct, 2 juveniles on Meiro mudflat; 2 Nov, up to 5 juveniles on the airport.
- Red-necked Stint *Calidris ruficollis*
13 Oct, a basic plumaged adult on Meiro mudflat; 8 Nov, a juvenile there.
- Red-necked Phalarope *Phalaropus lobatus*
Common offshore during the northern hemisphere winter.
- Arctic Skua *Stercorarius parasiticus*
Uncommon offshore.
- Pomarine Skua *Stercorarius pomarinus*
Uncommon offshore.
- White-winged Black Tern *Chlidonias leucopterus*
Seen only during the autumn migration period 8 Oct to 3 Nov, with the first individual being 3 days later than the earliest PNG record listed by Coates (1985). Usually near shore, with only 1 to 4 per day except for 60 on 11 Oct.
- Common Tern *Sterna hirundo*
The abundant and ubiquitous tern in Madang waters. My peak count in waters off CRI was 1600 on 7 Nov. The 2 counts at and near the Gogol River mouth roost revealed nearly 1900 on 11 Oct but only 180 on 17 Nov. Up to 73 roosting at the Meiro mudflat, mostly at low tide.

- Sooty Tern *Sterna fuscata*
Very rarely visible from shore, but common far offshore.
- Bridled Tern *Sterna anaethetus*
Drawn within sight from shore by tuna feeding near shore, but usually numerous only offshore.
- Grey-backed Tern *Sterna lunata*
Uncommon far offshore.
- Little Tern *Sterna albifrons*
Consistently common close to shore, but seldom more than 25 per day. However, numbers at and around roost sites were larger: up to 33 at Meiro mudflat and up to 240 at the Gogol River mouth.
- Crested Tern *Sterna bergii*
Sometimes visible from shore, usually while roosting on floating logs, but more common farther out. 17 Nov, 45 at the Gogol River mouth roost.
- Lesser Crested Tern *Sterna begalensis*
Only once or twice visible within view from shore, roosting on logs. Very scarce during my study.
- Brown Noddy *Anous stolidus*
Single Brown Noddies occasionally visible from shore, either over a tuna feeding frenzy or roosting on the platform of the Rasch Pass triangle marker. They were uncommon farther offshore.
- Black Noddy *Anous minutus*
Up to 35 roosted on the Rasch Pass triangle marker or rafted on the water beside it. These Black Noddies quickly joined any tuna feeding frenzies within or near the barrier reef. 11 Oct, 16 roosted on the beach at the Gogol River mouth. Also fairly common offshore.
- Brown Cuckoo-Dove *Macropygia amboinensis*
Encountered infrequently at Naru Hills, South Naru, and Wasab.
- Black-billed Cuckoo-Dove *Macropygia nigrirostris*
Only at Naru Hills, but Woinarski reported it at Baiteta.
- Great Cuckoo-Dove *Reinwardtoena reinwardtsi*
Occasionally flew by at Naru Hills, South Naru, Wasab, and near CRI.
- Emerald Ground-Dove *Chalcophaps indica*
At virtually all sites, except Naru Hills.
- Stephan's Ground-Dove *Chalcophaps stephani*
Only at the 4 sites with good forest: Naru Hills, South Naru, Malpain, and Wasab.

- Peaceful Dove *Geopelia striata*
Only in the drier Ramu Valley, where common.
- Cinnamon Ground-Dove *Gallicolumba rufigula*
Flushed once at South Naru. Reported by Woinarski at Baiteta.
- Pheasant Pigeon *Otidiphaps nobilis*
Heard at Naru Hills and South Naru, and flushed once at the former.
- Wompoo Fruit-Dove *Ptilinopus magnificus*
Common at the 4 forest sites. Rare near CRI.
- Pink-spotted Fruit-Dove *Ptilinopus perlatus*
Small numbers at the Malpain fruiting tree and Naru Hills.
- Ornate Fruit-Dove *Ptilinopus ornatus*
Common at the Malpain fruiting tree. Uncommon at Naru Hills, near CRI, and probably at Baitabag.
- Superb Fruit-Dove *Ptilinopus superbus*
Fairly common at Malpain, including the fruiting tree. Uncommon at Naru Hills. Reported at Baiteta by Woinarski.
- Coroneted Fruit-Dove *Ptilinopus coronulatus*
Found near CRI and at Malpain, including the fruiting tree.
- Beautiful Fruit-Dove *Ptilinopus pulchellus*
Small numbers at fruiting trees at Malpain, Wasab, and South Naru.
- Orange-billed Fruit-Dove *Ptilinopus iozonus*
Abundant everywhere except in the drier Ramu Valley, where I did not find it. Common even on Tab Island. 12 Oct, over 400 in and around the Malpain fruiting tree; up to 500 there on other days.
- Dwarf Fruit-Dove *Ptilinopus nanus*
Heard infrequently at South Naru and Naru Hills, but never seen.
- Purple-tailed Imperial Pigeon *Ducula rufigastra*
Small numbers heard and seen (with difficulty) within the forests of Naru Hills, South Naru, and Malpain.
- Pinon Imperial Pigeon *Ducula pinon*
Very common and conspicuous at Wasab. Less common at the Malpain fruiting tree, at South Naru, and at remnant forest trees in the Ramu Valley.
- Zoe Imperial Pigeon *Ducula zoeae*
Heard fairly often but in very small numbers at all good forest sites plus forest remnants at Utu and the Ramu Valley. Seen infrequently.

- Pied Imperial Pigeon *Ducula bicolor*
4 Nov, about 30 in the Ramu Valley, where it was conspicuous throughout the savanna and along the river.
- Papuan Mountain Pigeon *Gymnophaps albertisii*
Common throughout both hills and plains except the drier Ramu Valley. Very conspicuous flying overhead in flocks, less obvious and silent within the forest. Even visited offshore Tab Island to forage.
- Dusky Lory *Pseudeos fuscata*
At most sites, usually overhead during long flights, but nowhere numerous.
- Rainbow Lorikeet *Trichoglossus haematodus*
Common in edge habitats, less common in almost all other areas, but I saw no lorikeets or lories in the drier Ramu Valley.
- Western Black-capped Lory *Lorius lory*
Common at Baitabag, South Naru, and along the Naru River. Less common at almost all other sites.
- Palm Cockatoo *Probosciger aterrimus*
Up to 3 in the Naru Hills forest; singles at Wasab and in the Ramu Valley savanna.
- Sulphur-crested Cockatoo *Cacatua galerita*
Abundant in the Ramu Valley savanna and in the Naru Hills, where 30 on and beside a distant cliff were suspected of eating minerals from the cliff face. Much less common in other forest areas, but frequently seen.
- Buff-faced Pygmy-Parrot *Micropsitta pusio*
Common in small flocks at Malpain. Probably glimpsed in flight at Baitabag Mission. Reported just outside CRI/JAR by Baptista and at Wasab by the San Diego Zoo.
- Double-eyed Fig-Parrot *Cyclopsitta diophthalma*
Mostly in pairs, at South Naru, Naru Hills, and probably near Utu.
- Edwards' Fig-Parrot *Psittaculirostris edwardsii*
6 Nov, 1 male at Wasab. Reported at Baiteta by Woinarski.
- Red-cheeked Parrot *Geoffroyus geoffroyi*
Conspicuous in small numbers, usually calling in flight. Almost everywhere except the drier Ramu Valley habitats, but most common at Naru Hills, South Naru, and Wasab.
- Eclectus Parrot *Eclectus roratus*
In all forest and most forest remnant sites, but most sightings were of single males calling conspicuously in flight. More common in Naru Hills.

- Vulturine Parrot *Psitttrichas fulgidus*
Single individuals seen in flight at Naru Hills, one on each high ridgetop flanking the Naru River. Reported at Wasab by the PNGBS.
- Oriental Cuckoo *Cuculus saturatus*
24 Oct, 1 or 2 near South Naru; 6 Nov, 1 at Wasab; 26 Nov, 1 at Wasab.
- Brush Cuckoo *Cacomantis variolosus*
Heard fairly often and less frequently seen almost everywhere.
- Chestnut-breasted Cuckoo *Cacomantis castaneiventris*
Twice in the Naru Hills I stalked and attracted a calling pair to my imitation, but I never saw them. Woinarski reported it at Baiteta.
- White-crowned Koel *Caliachthrus leucolophus*
Rarely seen in forest edge at Naru Hills and Wasab, but never seen clearly.
- Dwarf Koel *Microdynamys parva*
Uncommonly heard and rarely seen at all 4 good forest sites, plus Baitabag.
- Common Koel *Eudynamys scolopacea*
20 Nov, 1 female on Tab Island.
- Channel-billed Cuckoo *Scythrops novaehollandiae*
12 Oct, a flock of 5 calling in flight was pursued by a Grey Crow over Malpain.
- Lesser Black Coucal *Centropus bernsteini*
Numerous in the sugar cane and tall grassland of the Ramu Valley. Seen flying into very tall grasses along roadsides throughout the coastal plain and hills, and in the reeds at the Alexishafen ponds.
- Barn Owl *Tyto alba*
24 Sep, 1 perched over the North Coast Road 24 km north of the JAR turnoff was the only bird seen on the night drive.
- Papuan Nightjar *Eurostopodus papuensis*
5-27 Oct, 1 regularly flushed from the ground behind a fallen log in the Malpain forest but I could never find eggs; 27 Oct, 2 individuals flushed together from the same spot, with 1 there later that morning.
- Large-tailed Nightjar *Caprimulgus macrurus*
11 Nov, 1 flew in front of my vehicle, crossing the Madang-Lae Road near the Balek Reserve at 0523.
- Moustached Tree-Swift *Hemiprocne mystacea*
Adundant on the power transmission wires along the Madang-Lae Road through the Gogol Valley and Naru Hills, with up to 50 seen per trip. Also at forest edge of most other sites.

- Uniform Swiftlet *Collocalia vanikorensis*
Throughout the region, but apparently more common on the coastal plain (e.g., CRI and South Naru).
- Three-toed Swiftlet (?) *Collocalia papuensis*
This identification should be considered tentative. These swiftlets were noticeably larger, longer-tailed, and paler-throated than the Uniform Swiftlets. Up to 10+ were seen at Baitabag, plus 1 or more were between CRI and near Malpain. Thus, whatever this species, I only saw it at or near the edge of the lower coastal hills.
- Glossy Swiftlet *Collocalia esculenta*
Common foraging just above the road at Naru Hills and South Naru. Also at Malpain, Utu, and elsewhere.
- White-throated Needletail *Hirundapus caudacutus*
6 Nov, 1 at Wasab, first arrival; 18 Nov, 18 in 90 minutes of casual watching near CRI. Fairly common overhead anywhere near the coast after 6 Nov. Strangely, virtually every individual was flying north. Could this species migration follow the south side of New Guinea to such an extent that most visitors to Madang Province arrive there by flying around the east end of New Guinea?
- Common Paradise-Kingfisher *Tanysiptera galatea*
Common heard and infrequently seen in all 4 good forest areas. Also heard at Baitabag.
- Hook-billed Kingfisher *Melidora macrorrhina*
22 Oct, 1 female perched 7 m up in South Naru forest. Heard at Naru Hills by Palliser (1989).
- Rufous-bellied Kingfisher *Dacelo gaudichaud*
Common everywhere with forest or groves of trees. Heard often.
- Forest Kingfisher *Halcyon macleayii*
Common and conspicuous everywhere habitats are sufficiently open, except only 1 seen in the Ramu Valley, at Dumpu. 21 Oct, a somewhat melanistic individual was mated to a normal bird near Utu.
- Sacred Kingfisher *Halcyon sancta*
Common around CRI, rarely seen elsewhere. Coates (1985) states "... (many localities being vacated in early October) with a few birds lingering in southern areas until mid November. Odd birds rarely remain throughout the year." Although this species became rare around CRI in Oct, in Nov I watched a pair of Sacred Kingfishers displaying to each other quietly (17 Nov) and violently (25 Nov). Whether these displays were courtship or territorial, they raise the possibility that there was an intent to breed locally.

- Beach Kingfisher *Halcyon saurophaga*
True to its name, this species was fairly common on the barrier islands and some mainland shores. It was very difficult to approach. Beginning 23 Oct, 1 or 2 calling birds often cruised the CRI/JAR grounds early and/or late in the day.
- Yellow-billed Kingfisher *Halcyon torotoro*
Heard and rarely seen at Malpain, Naru Hills, and Wasab, the 3 sites of hilly forest.
- Dwarf Kingfisher *Ceyx lepidus*
Infrequently heard and rarely seen at Wasab, Naru Hills, and South Naru. 12 Nov, at Wasab a calling bird repeatedly flew across the end of a logging road in the active felling zone. Perhaps this was a distress reaction to the disembowelment of its home.
- Azure Kingfisher *Alcedo azurea*
Seen and heard in small numbers at all 4 forest sites and near Utu. Reported near CRI by the PNGBS.
- Common Kingfisher *Alcedo atthis*
9 Oct, 1 found by wading up the Naru River; 23 Nov, 1 at Tapo Creek at first light was probably this species. Reported near CRI by Diamond and Erlich.
- Blue-tailed Bee-eater *Merops philippinus*
4 Nov, common (60+) in Ramu Valley, mostly in grassland and canefields, including 30 together at the savanna/grassland ecotone.
- Dollarbird *Eurystomus orientalis*
Encountered in small numbers at most sites, but not at the Ramu Valley.
- Blyth's Hornbill *Rhyticeros plicatus*
Up to 6+ individuals found each visit to the Naru Hills forest, where their noisy flight made them hard to miss. 2 or 3 also at Wasab, at the active felling area. Reported at Baiteta by Woinarski.
- Blue-breasted Pitta *Pitta erythrogaster*
Heard infrequently at all 4 forest sites, and seen superbly at South Naru after a careful stalk.
- Singing Bushlark *Mirafrja javanica*
4 Nov, about 20 in the Ramu Valley, where many were skylarking endlessly in the grassland and others were closely seen in ploughed and new growth canefields. Of the localities cited by Beehler *et al.* (1986), the Markham Valley is nearest, and as it is essentially continuous with the upper Ramu Valley it is not surprising that this species is common there.
- Pacific Swallow *Hirundo tahitica*
Common in all open areas, especially near water, except in the Wasab clearcut.

- Tree Martin *Hirundo nigricans*
4 Nov, 2 to 4 seen over the Ramu Valley grassland.
- Richard's Pipit *Anthus novaeseelandiae*
Beehler *et al.* (1986) state "... unconfirmed reports from Markham Valley lowlands and ...". 4 Nov, 8 in the Ramu Valley grassland and ploughed and new growth cane fields. They were not singing much, but I had fine views of several on the ground. Clearly, they are not only present but common in the Ramu/Markham Valley lowlands.
- White-bellied Cuckoo-Shrike *Coracina papuensis*
Widespread, but not common. Found near CRI, Baitabag, Aguru, Naru Hills, and probably Wasab.
- Stout-billed Cuckoo-Shrike *Coracina caeruleogrisea*
4 Nov, 6 to 10 along the Ramu River and in the denser savanna. This was a surprise, as Beehler *et al.* (1986) consider this a forest species that is "occasionally at edge or in regrowth". However, the massive bill, long tail, large size, and males' mask were all seen on several birds. All were shy. Perhaps their elusiveness in these more open habitats, together with the lack of coverage in the upper Ramu Valley (see Singing Bushlark and Richard's Pipit), and perhaps only seasonal presence, have caused this species to be missed. Woinarski reported it at Baiteta.
- Boyer's Cuckoo-Shrike *Coracina boyeri*
Common at the Malpain fruiting tree, and less common at Naru Hills and Wasab.
- Cicadabird *Coracina tenuirostris*
1 to 3 at Baitabag Mission, Malpain, and Tab Island. All birds were in female plumage. My latest date was 2 Oct, so probably most migrants are gone by the middle of this month.
- Black Cuckoo-Shrike *Coracina melaena*
Infrequently seen at Naru Hills and Wasab.
- White-winged Triller *Lalage sueurii*
4 Nov, 4 in the Ramu Valley; a pair in savanna plus separate male and female in grasslands.
- Black-browed Triller *Lalage atrovirens*
Commonly heard and seen travelling high along most forest edges, less often across the canopy.
- Pied Chat *Saxicola caprata*
4 Nov, common, 20+ in the Ramu Valley grassland and cane fields.
- Blue Jewel-Babbler *Ptilorrhoa caerulescens*
Infrequently heard and glimpsed in forest at Malpain and South Naru.

- Rufous Babbler *Pomastomus isidorei*
Small bands commonly encountered at South Naru, where 1 nest was discovered; less commonly at Naru Hills and Wasab. Often formed the nucleus of a mixed flock.
- Clamorous Reed-Warbler *Acrocephalus stentoreus*
4 Nov, 2 heard singing (1 seen) in Ramu Valley reeds.
- Tawny Grassbird *Megalurus timoriensis*
4 Nov, 1 in reeds by Ramu Sugar cane fields.
- Golden-headed Cisticola *Cisticola exilis*
4 Nov, abundant, 75-100, in the Ramu Valley grassland and savanna. Many were skylarking. Also resident in tall grasses by Baitabag School.
- Rusty Mouse-Warbler *Crateroscelis murina*
Rarely heard in the Naru Hills forest.
- Pale-billed Scrub-Wren *Sericornis spilodera*
21 Nov, 1 low in a mixed flock in Naru Hills forest.
- Yellow-bellied Gerygone *Gerygone chrysogaster*
Uncommonly encountered at Naru Hills, Malpain, and Wasab.
- Green-backed Gerygone *Gerygone chloronotus*
Heard abundantly at Wasab, less common at the other forest sites.
- Fairy Gerygone *Gerygone palpebrosa*
23 Nov, 1 male in a mixed flock in the Naru Hills forest.
- Large-billed Gerygone *Gerygone magnirostris*
24 Oct, a pair along roadside forest edge near South Naru.
- Sooty Thicket-Fantail *Rhipidura threnothorax*
Heard regularly and infrequently seen within all 4 forests, normally only 1 or 2 per visit.
- White-bellied Thicket-Fantail *Rhipidura leucothorax*
Commonly heard and uncommonly seen at virtually all sites, but especially common on the coastal plain near CRI and at South Naru. Seemed more numerous than the last species, as well as more widespread, being tolerant of edge.
- Rufous-backed Fantail *Rhipidura rufidorsa*
5 Oct, 1 in forest at Malpain.
- Chestnut-bellied Fantail *Rhipidura hyperthra*
Twice a pair in Naru Hills forest, once part of a mixed flock.
- Northern Fantail *Rhipidura rufiventris*
Small numbers in all forest sites.

- Willie Wagtail *Rhipidura leucophrys*
Abundant and ubiquitous in all areas except forest.
- Island Monarch *Monarcha cinerascens*
2 Oct, 1 seen within the strand forest on Tab Island. Inconspicuous, and not found on subsequent searches.
- Spot-winged Monarch *Monarcha guttula*
Regularly found in all forests, and common at South Naru.
- Hooded Monarch *Monarcha manadensis*
Uncommon but regular in forest at Malpain, South Naru, and Naru Hills.
- Golden Monarch *Monarcha chrysomela*
Uncommon at all forest sites, both within the forest and along edges.
- Friiled Monarch *Arses telescopthalmus*
Regular in all forests, but appeared more common at Malpain and Naru Hills. 5 Oct, pair building a nest at Malpain; I was unable to relocate the spot on later visits.
- Shining Flycatcher *Myiagra alecto*
Widespread along roads and edges, less in forest. Appeared more numerous on the coastal plain as near CRI and at South Naru. Also found on Tab Island.
- Yellow-breasted Boatbill *Machaerirhynchus flaviventer*
Single females seen in forest at Naru Hills (thrice) and Malpain, always in mixed flocks.
- Olive Flycatcher *Microeca flavovirescens*
Up to 2 in mixed flocks at Naru Hills forest. Reported at Baiteta by Woinarski.
- Mangrove Golden Whistler *Pachycephala melanura*
Abundant and vocal on Tab Island. Although the PNGBS identified these birds as (Common) Golden Whistlers, on 3 different trips to this island I checked the characters of both males and females and concluded that they were Mangrove Golden Whistlers. Both sexes had grey-edged, not green-edged, secondaries. Males had black tails, and the tails of females were black with grey rectrix edges. The collars and breast bands of males were quite broad. 4 Oct, I recorded ½ hour of songs and calls. Don Robertson (pers. comm.) had independantly identified these as Golden Mangrove Whistlers during a prior visit to Tab Island. Mangrove Golden Whistler is the species to be expected on small coastal islets (Beehler *et al.* 1986).
- Grey Whistler *Pachycephala simplex*
Fairly often heard and seldom seen in all forests.
- Little Shrike-Thrush *Colluricincla megarhyncha*
Regularly found in forest at Naru Hills and Malpain, but did not seem numerous.

- Variable Pitohui *Pitohui kirhocephalus*
Encountered infrequently in forest and edge at Naru Hills, South Naru, and Wasab. Reported near CRI by Diamond and Erlich.
- Hooded Pitohui *Pitohui dichrous*
Encountered in forest at Malpain and Naru Hills. Reported at Wasab by the San Diego Zoo and near CRI by the PNGBS.
- Rusty Pitohui *Pitohui ferrugineus*
Encountered infrequently in forest at South Naru and Naru Hills. Reported at Wasab by the San Diego Zoo. All 3 pitohuis were typically found in small parties as nuclei of mixed flocks.
- Black Berrypecker *Melanocharis nigra*
Small numbers found in all forests and their edges.
- Papuan Flowerpecker *Dicaeum pectorale*
Found at edges of all forests, plus at Baitabag Mission. Seemed most numerous at Baitabag and Naru Hills.
- Black Sunbird *Nectarinia aspasia*
Common at all mainland sites except drier Ramu Valley, where none were seen. Mostly at edges. Uncommon on Tab Island.
- Yellow-bellied Sunbird *Nectarinia jugularis*
Common in disturbed sites and in Ramu Valley savanna and other woods. Not seen by me even at edges of the 4 forest sites, except South Naru, but reported at Baiteta by Woinarski.
- Tawny Straightbill *Timeliopsis griseigula*
27 Oct, 1 hanging upside-down and poking into hanging leaves in the highest canopy at Malpain.
- Long-billed Honeyeater *Melilestes megarhynchus*
26 Sep, pair seen at forest edge at Malpain. Reported at Wasab by the San Diego Zoo.
- Yellow-bellied Longbill *Toxorhamphus novaeguineae*
Found infrequently at all forests.
- Dwarf Honeyeater *Oedistoma iliolophus*
Occasionally seen at Naru Hills, within the forest or at its edge. Reported at Baiteta by Woinarski and at Wasab by the PNGBS.
- Pygmy Honeyeater *Oedistoma pygmaeum*
Seen infrequently at Naru Hills, South Naru, and Wasab. Best observed by following the quick movements of the small bands through the canopy along roadside by using a spotter scope, though this requires fast reactions.

- Green-backed Honeyeater *Glycichaera fallax*
22 Oct, 1 singing briefly in mangroves, then darting into scrub bordering coconut plantation, between JAR gate and Riwo Village.
- Red-throated Myzomela *Myzomela eques*
Seen occasionally in small bands at Naru Hills, on forest canopy edge. Reported at Wasab by the San Diego Zoo.
- Puff-backed Meliphaga *Meliphaga aruensis*
Infrequently seen in forest at Malpain and South Naru.
- Mimic Meliphaga *Meliphaga analoga*
Encountered at virtually all sites. Seemed most common along roads near CRI and in Naru Hills. Not found in dry habitats of Ramu Valley, though it was in a swamp island in their midst. The only meliphaga found away from forest.
- Yellow-gaped Meliphaga *Meliphaga flavirictus*
28 Nov, 1 at South Naru, in the canopy of a lower section of the forest beside the road. I saw all 3 above species of meliphaga at South Naru that morning.
- Varied Honeyeater *Lichenostomus versicolor*
Abundant and conspicuous in coastal habitats, including on Tab Island. Not found by forests or in hills.
- Tawny-breasted Honeyeater *Xanthotis flaviventer*
Commonly heard but seldom seen well; mostly near edges of all forests. Also found at remnant patches and regrowth.
- Plain Honeyeater *Pycnopygius ixoides*
12 Nov, 1 at Wasab; 19 Nov, 1 at South Naru.
- Streak-headed Honeyeater *Pycnopygius stictocephalus*
Seen and heard fairly commonly in second growth edge and tall scrub near CRI and Baitabag, and at Wasab and South Naru. 4 Nov, common in the denser savanna-woodland and swamp forest in the Ramu Valley.
- Meyer's Friarbird* *Philemon meyeri*
Found at all forests, but not conspicuous and typically only small numbers seen. Seemed most common along the road at Naru Hills.
- Helmeted Friarbird *Philemon buceroides*
Common and conspicuous everywhere there are trees, including Tab Island and the drier Ramu Valley.

- Streak-headed Mannikin *Lonchura tristissima*
Common in very small flocks, mostly in tall grass along roads through forest but also visiting larger patches of tall grass in more disturbed areas such as Baitabag. Baptista (ms.) never saw this species in large flocks, but I saw up to 40 in a flock at Malpain, though very few remained there after the tall grass was cut. Not seen in the drier, more open Ramu Valley.
- Grand Mannikin *Lonchura grandis*
4 Nov, small flocks (total 10) only in very tall grasses along streams through the Ramu Valley savanna. 27 Nov, 1 flock of 12 at the Baitabag School. Most of the latter birds were in juvenile plumage.
- Hooded Mannikin *Lonchura spectabilis*
4 Nov, flocks totalling 20+ were only in completely treeless grassland of the Ramu Valley. I did not find this species on the coastal slope, but Baptista (ms.) twice saw 1 individual at Baitabag School.
- Chestnut-breasted Mannikin *Lonchura castaneothorax*
4 Nov, small flocks totalling 20+ only in the grass of savanna in the Ramu Valley. 16 Oct, one pair in the grass along the North Coast Road at the west end of the Madang airport was the only time I found this species on the coastal slope. In contrast, Baptista (ms.) considered it the second most common mannikin around Madang.
- Metallic Starling *Aplonis metallica*
Abundant, often in large flocks, in open areas and edges associated with all forests. Large colony within 2 km of CRI, but rare on the coast itself. Not found in the Ramu Valley. Thus, these two species of starlings have almost completely complementary habitat distributions in this region.
- Golden Myna *Minos anais*
Encountered infrequently at the Naru Hills and near Utu, always in groups of two or three near Yellow-faced Mynas but seeming much more shy. Reported at Wasab by the PNGBS. The Naru Hills site was 600 m elevation, above the maximum 350 m given by Beehler *et al.* (1986).
- Yellow-faced Myna *Mino dumontii*
Fairly common and very conspicuous at edges of all forests. Single or multiple pairs calling from high perches.
- Brown Oriole *Oriolus szalayii*
Fairly common and vocally conspicuous mostly high on the edges of all forests and many areas of secondary growth, including near CRI. Seemed most numerous at Wasab, Baku, and South Naru.

- Sprangle Drongo *Dicrurus hottentottus*
Fairly common and vocally conspicuous within and at edges of all forests. Seemed most numerous at Wasab and Naru Hills. Also found at Baitabag. Often with mixed flocks.
- White-breasted Wood-Swallow *Artamus leucorhynchus*
4 Nov, very common, 50-100, in Ramu Valley.
- Hooded Butcherbird *Cracticus cassicus*
Fairly common and vocally conspicuous at Baitabag Mission. Uncommon at Wasab, Naru Hills, near Utu, and near Aguru. Reported at Baiteta by Woinarski and the PNGBS.
- Lowland Peltops *Peltops blainvillii*
Fairly common at edges of all forests. More numerous at Wasab and Malpain. Uncommon at remnant edges near CRI and elsewhere. Vocally conspicuous.
- White-eared Catbird *Ailuroedus buccoides*
Heard and seen infrequently within forests of Malpain, Naru Hills, and South Naru. Usually located by its harsh hisses.
- Yellow-breasted Bowerbird *Chlamydera lauterbachii*
4 Nov, common in the savanna and at other trees in the drier Ramu Valley. See following species.
- Fawn-breasted Bowerbird *Chlamydera cerviniventris*
4 Nov, common in the savanna and at the other trees in the drier Ramu Valley. These two congeneric bowerbirds were syntopic in the savanna, at least southeast of Hupai, and both were seen repeatedly (10+ of each) wherever there were trees in these drier open habitats.
- Glossy-mantled Manucode *Manucodia atra*
Uncommonly heard and infrequently seen at a variety of forest edges and remnants, most noticeably at Wasab. Also at South Naru, Malpain, and Nobanob, and reported near CRI by Diamond and Ehrlich. These locations are at lower elevations than the ridgetops of Naru Hills, where the following two species were observed.
- Crinkle-collared Manucode *Manucodia chalybata*
31 Oct, one pair seen and heard along road in Naru Hills.
- Jobi Manucode *Manucodia jobiensis*
9 Oct, one pair seen and heard along road in Naru hills.
- Magnificent Riflebird *Ptiloris magnificus*
30 Sep, male heard and two females seen in forest at Naru Hills. Reported at Wasab by San Diego Zoo.
- King Bird of Paradise *Cicinnurus regius*
Uncommonly seen and heard within all forests.

- Magnificent Bird of Paradise *Cicinnurus magnificus*
Occasionally heard and rarely seen in the forest at Naru Hills and just beyond feeling zone at Wasab. Possibly heard at South Naru. No adult males seen.
- Raggiana Bird of Paradise *Paradisaea raggiana*
30 Sep & 9 Oct, single female-plumaged bird(s) seen at the same place along road at Naru Hills; 21 Oct, female-plumaged bird at Nobanob.
- Lesser Bird of Paradise *Paradisaea minor*
Common and vocally conspicuous at Naru Hills, South Naru, and Wasab. Apparently less common at Malpain. Also found in my only visits to Utu and Nobanob.
- Grey Crow *Corvus tristis*
Common and conspicuous in a few raucous, highly mobile flocks at Naru Hills and Wasab, less commonly at Malpain.
- Torresian Crow *Corvus orru*
Common and very conspicuous in coastal areas, including Tab Island. Less commonly found in the forested and/or hilly sites. Not found in the drier Ramu Valley. Numbers regularly made long, high flights parallel to the coast, especially early and late in the day.

DISCUSSION

Terns of several species use the Gogol River mouth and the Meiro mudflat for roosting. Otherwise the shore in the Madang region seems to be unused by marine birds.

Waders and herons are relatively scarce, and the only sites of concentration found are the Meiro mudflat and the adjacent Madang airport. During October-November, when the numbers of southbound waders should be at or near their yearly maxima, 12 of the 13 species there were represented by fewer than 15 individuals. Pacific Golden-Plover greatly outnumber all other waders combined, with counts ranging up to 230. Waders were seen in both juvenal and basic plumages, so birds of both age classes visited Madang.

Freshwater habitats are very few and small, and local populations of birds inhabiting them are correspondingly low. Ponds even within metres of each other vary greatly in their use by birds, perhaps largely reflecting their safety from predation. The smaller pond at Alexishafen held ten visible species of freshwater and marsh birds.

Although genuine marshes seem rare in the Madang area, damp areas of tall grass or bamboo are common along roads. Bird populations of these and other open habitats must be expanding as the forests are removed.

The drier open habitats of the upper Ramu Valley (savanna grassland and sugarcane fields) host avifaunas quite different from that found in openings along the wet Madang coastal plain. Some of these species are typical of the large highland valleys, e.g. Singing Bushlark,

Richard's Pipit, Hooded Mannikin and Yellow-breasted Bowerbird. Others represent coastal plain savanna species, e.g. Pied Imperial Pigeon, Blue-tailed Bee-Eater, White-winged Triller, and Fawn-breasted Bowerbird. A large component is widespread in open habitats of both highlands and lowlands. Edge species are also conspicuous in the Ramu Valley.

Most species of edge and regrowth seem to be widespread and thriving in the Madang region, as would be expected with the declining of the forests. Except for secretive species, most are easily found and observed close to roads, without obvious localization of these species.

Most forest species probably inhabit all of the four good forests I birded. Undoubtedly there are differences in their species lists, but many more observations would be necessary to define these differences. South Naru, the only flat forest should lack some of species found in the hill sites, and vice versa. The difference most apparent to me was that the lesser human presence in the Naru Hills forest allowed the persistence of more vulnerable birds than at the other sites. These was measured in three ways: (1) presence of very sensitive species such as the Northern Cassowary and Vulturine Parrot; (2) abundance of other large vulnerable birds including Blyth's Hornbill, Palm Cockatoo, Sulphur-crested Cockatoo; (3) species diversity of certain taxa, e.g. seven of the eight species of birds of paradise were found at Naru Hills, versus three or four species at each of the other forests. Nevertheless, based on my limited sampling, the other forests seemed to retain most of their original species, and some large and/or sensitive birds were found there (e.g. New Guinea Harpy-Eagle at Malpain, Blyth's Hornbill at Wasab, and Brown-collared Brush-Turkey at all four sites). The flat coastal plain forests and the birds restricted to them should be the most threatened around Madang. Perhaps one reason I did not see a major difference between the South Naru forest and the three hilly sites is that South Naru may have already lost the species most distinctive of the flat forest.

The avifauna of the coastal barrier islands represent a small subset of the birds on the mainland coast, with most landbirds belonging to ubiquitous species. A few species are virtually restricted to these island, e.g., White-headed Kingfisher, Island Monarch, and Mangrove Golden Whistler. Common Scrubfowl has remained abundant on uninhabited Tab Island, whereas it has become scarce on the mainland.

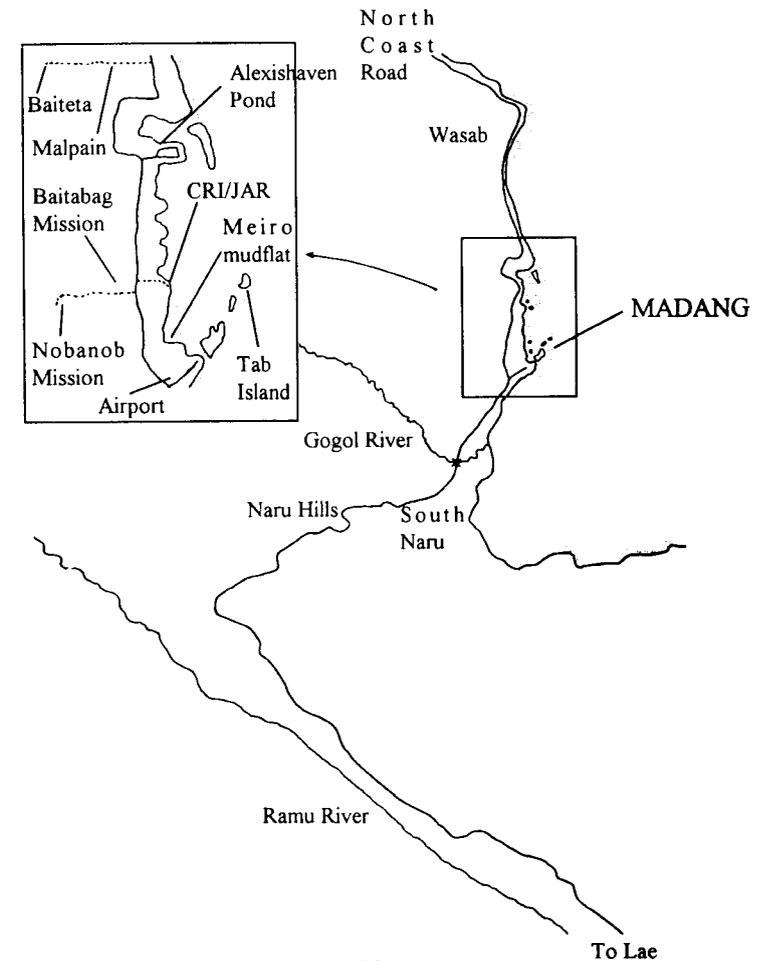
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visa and extension, as did Roger and Jennifer Hicks. Roger Hicks also provided supplemental bird observations from the PNGBS field trip to the Madang areas in March 1989. This is CRI publication Number 47.

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A SECOND LOWLAND POPULATION OF THE WHITE-FACED ROBIN *TREGELLASIA LEUCOPS*

GEORGE E. CLAPP

I report here sightings of a previously undiscovered lowland population of the White-faced Robin *Tregellasia leucops*. These sightings were made at an altitude of 145 m at a location known as Langia, between the Aiema and Ariama Rivers, some 25 km from the nearest point on the Strickland River and approximately 75 km east of the island village of Miwa, off the southern shores of Lake Murray, in the Western Province of Papua New Guinea

I was present daily at Langia between 23 September and 2 October 1990, although I could observe birds only opportunistically. I was surveying the perimeter of an elongated piece of land some 10 ha in area, but saw *T. leucops* in only one fairly restricted locality along that perimeter. Sightings of *T. leucops* were made on two separate days, 27 and 28 September, on each occasion of a single individual, but these were not sufficiently far apart to be certain that different individuals were involved. The size of the newly discovered population remains unknown.

The forest at Langia varies considerably as a function of the drainage, which is reflected in the regional topographical relief pattern, i.e., a series of flat ridges and broad dips, the local relief approximating 60 or 70 m vertical elevation. *T. leucops* was sighted only in forest that was dry underfoot, with relatively sparse undergrowth and many smaller trees and large, mature rainforest trees scattered throughout. The ground was gently sloping and the forest was relatively easy to move through. The general area of the sightings was near and at the top of one of the aforementioned broad, flat ridges.

The first individual seen was perched upright on a slender limb, the second was perched sideways against a tree trunk. Both were within three metres of the ground. The forehead appeared all white, the crown black, face and lores were white with the black of the crown extending round behind the eye and below its level in a black semi-circle. The gap between the black and the eye was reasonably large. The breast and the abdomen were bright yellow. Chin and throat colouration were not noted. The back and wings were dark brown and the upper tail almost black. The legs were yellow and the beak (upper and lower mandible) appeared white.

It is interesting, perhaps significant, that *Rhipidura hyperythra*, which is also basically a hill forest species but with lowland populations in the upper and lower Trans-Fly (Coates 1990), was seen and heard on several occasions around the perimeter and is evidently common at Langia. The only previously known (and apparently relict) lowland population of *T. leucops* was found Oriomo, over 200 km to the southwest, and for which the altitude was given as "near sea level" (Mayr and Rand 1937). Of the various authorities Coates

(1990) cites the widest altitude range for *T. leucops* viz. "from about 300 up to 2200 m, mainly 600 to 1650 m, and locally in the lowlands in the southern Trans-Fly region."

It is quite possible from the description that the Langia birds constitute a previously unknown sub-species, but only specimens will confirm this.

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APPENDIX SPECIES RECORDED AT LANGIA

Southern Cassowary	<i>Casuarus casuarus</i>
Seen (once) and heard, plus many droppings.	
Common Scrub-Fowl	<i>Megapodius freycinet</i>
Many mounds seen and birds heard.	
Superb Fruit-Dove	<i>Ptilinopus superbus</i>
One male seen in the lower mid-canopy.	
Wompoo Fruit-Dove	<i>Ptilinopus magnificus</i>
Heard only.	
Zoe Imperial pigeon	<i>Ducula zoeae</i>
Heard only.	
Southern Crowned Pigeon	<i>Goura sheepmakeri</i>
Heard only.	
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>
Seen and heard. In one particularly good view of a small flock of these birds in the low stage, the colouration of the head appeared very dark, almost black.	
Western Black-capped Lory	<i>Lorius lory</i>
Seen and heard. By colouration, definitely the race <i>L.l. rubiensis</i> .	
Palm Cockatoo	<i>Probosciger aterrimus</i>
Seen and heard, but not common.	
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
Seen and heard.	
Red-checked Parrot	<i>Geoffroyus geoffroyi</i>
Seen and heard.	
Hook-billed Kingfisher	<i>Melidora macrohina</i>
Heard many times but not seen.	
Yellow-billed Kingfisher	<i>Syma torotoro</i>
Heard only.	
Rainbow Bee-eater	<i>Merops ornatus</i>
Seen and heard at the clearing.	
Blue-breasted Pitta	<i>Pitta erythrogaster</i>
Heard only.	
Hooded Pitta	<i>Pitta sordida</i>
In contrast to <i>P. erythrogaster</i> , which was heard on many occasions, <i>P. sordida</i> , although heard several times, was heard on the one day only, on 25 September.	
Rusty Mouse-Warbler	<i>Crateroscelis murina</i>
Heard only.	

Yellow-bellied Gerygone Seen and heard.	<i>Gerygone chrysogaster</i>
Sooty Thicket-Fantail Heard several times and one bird seen indistinctly.	<i>Rhipidura threnothorax</i>
Chestnut-bellied Fantail Good views were obtained of this basically hill forest species, which is common at Langia.	<i>Rhipidura hyperythra</i>
Spangled Drongo Seen and heard, but not common. The single bird seen was blue glossed, indicating the resident race	<i>Dicrurus hottentottus</i>
Friilled Monarch Amongst other sightings, on 26 September a pair was seen building a nest about 15-20 m up. The nest was suspended from the lower crown of a large tree by two tendrils, one of either side of the cup. Both male and female brought material for the nest. When the observation finished the female had been sitting in the nest for some minutes.	<i>Arses telescopthalmus</i>
White-faced Robin The presence of this distinctive hill forest/lower montane species was completely unexpected. It was, however, seen on two occasions only, and in a restricted area.	<i>Tregellasis leucops</i>
Helmeted Friarbird Seen and heard, occasionally heard duetting.	<i>Philemon buceroides</i>
Tawny-breasted Honeyeater Seen and heard.	<i>Meliphaga flaviventer</i>
Puff-backed Honeyeater Seen and heard. The identification was based mainly on the relatively stout beak and the large yellow auricular, appearing rounded at the distal end.	<i>Meliphaga aruensis</i>
Mimic Honeyeater 16 or 17 cm, a shrill "tup"; yellow auricular; brown wings and back; apparently unmarked, grey underside; relatively long bill. This bird was bathing in a pool of water formed by a small hollow in a horizontal log at the forest edge.	<i>Meliphaga analoga</i>
Papuan Flowerpecker Seen and heard.	<i>Dicaeum pectorale</i>
Black Berrypecker Heard only.	<i>Melanocharis nigra</i>
Brown Oriole Heard only, but common.	<i>Oriolus szalayi</i>
Hooded Butcherbird Seen and heard.	<i>Cracticus cassicus</i>
Magnificent Riflebird Heard only, but common, the powerful, whistled calls of <i>P. m. magnificus</i> .	<i>Ptiloris magnificus</i>
Raggiana Bird of Paradise Seen and heard. Appeared to be pure <i>P. raggiana</i> .	<i>Paradisaea raggiana</i>
Grey Crow Seen and heard.	<i>Corvus tristis</i>

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BIRDS OF SONOMA

DON HALLIDAY

A few years ago I wrote for the Newsletter an account of the birds sighted during a short stay at Kambubu High School, on the Gazelle Peninsula some two hours' drive from Rabaul. Recently my wife and I were able to spend about eleven weeks at Sonoma College, also situated near Rabaul, and this is an account of the birds we saw there. Many of the birds sighted there had already been seen at Kambubu. We were fortunate to be able to spend three days at Kambubu while we were at Sonoma.

Sonoma is situated on a plateau about 50 km from Rabaul. It is in plantation country, with groves of coconuts and cacao trees all around, interspersed with groves of natural or second growth bushland. Both the plantations and the bushland are inhabited by many species of birds. Following is a list of those that we saw.

Frigatebirds

Fregata spp.

A few of these were seen during our visit to Kambubu. I am not sure whether they were of the greater or lesser kind.

Brahminy Kite

Haliastur indus

Some were occasionally seen, and on one occasion four or five were seen at once.

Common Scrub-Fowl

Megapodius freycinet

While travelling through forest land we saw a black bird disappearing into the bush at the side of the road. The local people who were with us told us that this was a scrubfowl. On another occasion they told us that a bird which we could hear calling from a nearby valley was also a scrubfowl.

Orange-fronted Fruit-Dove

Ptilinopus aurantiifrontis

One was sighted on one occasion, but they were often heard calling from nearby bushland.

Emerald Ground-Dove

Chalcophaps indica

These were sighted on several occasions. We saw one on our visit to Kambubu, and on this occasion the bird flew in a large circle round us, beneath the level of the lower branches of the cacao grove where we were at the time. This was the best view we had ever had of a ground-dove, since they usually fly off in a straight line and quickly disappear. Perhaps there was a nest nearby. I noticed in Peckover & Filewood (1976) that this bird is on the mainland, and Stephan's Ground-Dove is the one found in the Bismarck Archipelago. That may have been what we saw.

- Rainbow Lorikeet *Trichoglossus haematodes*
The familiar screech was often heard as they fed among the upper branches of flower-producing trees.
- Eastern Black-capped Lory *Lorius hypoinochrous*
We saw none of these at Sonoma, but they were very common in the crowns of the coconut palms in the plantation at Kambubu.
- Red-flanked Lorikeet *Charmosyna placensis*
Like the Rainbow Lorikeets, these birds were often seen noisily feeding on pollen in the crowns of trees that were flowering at the time.
- Eclectus Parrot *Eclectus roratus*
The familiar call of the males was often heard in the early morning as they flew around. I think of the buzz of a telephone when I hear them. On one occasion I saw a female, which has a call like a screech.
- Brush Cuckoo *Cacomantis variolosus*
The rising call of these birds was often heard from the nearby bush, and occasionally they could also be seen.
- Pied Coucal *Centropus ateralbus*
These birds seem to be peculiar to the Bismarcks. They are fairly common. Unlike their cousins the Pheasant Coucals, they are rarely seen on the ground, but rather in the crowns of coconut palms, and sometimes out in plain view ~~standing~~ on the fronds.
- Large-tailed Nightjar *Caprimulgus macrurus*
We did not manage to see one of these birds, but we heard them often enough at night time, with their peculiar chopping call.
- Moustached Tree-Swift *Hemiprocne mystacea*
On a couple of occasions we saw one of these birds sitting on a bare limb waiting for a chance to catch insects. We also saw them in flight.
- Glossy Swiftlet *Collocalia esculenta*
These birds were very common, flying round searching for insects.
- Dwarf Kingfisher *Ceyx lepidus*
Only one of these birds was seen, perched on a small tree in a plantation.
- Forest Kingfisher *Halcyon macleayi*
One of these was seen frequently in a place on the edge of the school gardens.
- Sacred Kingfisher *Halcyon sancta*
These were very common.
- Rainbow Bee-eater *Merops ornatus*
Seen on a number of occasions, mainly in clearings near coconut trees.

- Varied Triller *Lalage leucomela*
Seen and heard on many occasions, mainly near african tulip trees.
- Cicadabird *Coracina tenuirostris*
These were seen on several occasions in a grove of coconuts where the undergrowth had been cleared underneath.
- Great Reed-Warbler *Acrocephalus arundinaceus*
One was seen only once in a patch of reeds at the edge of a dried pond.
- Golden-headed Cisticola *Cisticola exilis*
These little birds were often seen and heard, perched on the tops of any handy vegetation such as a coconut palm or the top of a cassava plant.
- Northern Fantail *Rhipidura dahli*
Occasionally seen in patches of bush.
- Willie Wagtail *Rhipidura leucophris*
Very common around the college buildings. One pair had a nest on top of a light pole overlooking the basketball court. I wondered why they seemed to be taking so long to hatch out a brood, until I was informed that some of the boys had somehow climbed up there and disposed of one clutch of eggs. The wagtails were frequently heard during the night, which could be very annoying if one was trying to catch a little extra sleep in the early morning.
- Shining Flycatcher *Myiagra alecto*
These beautiful birds were seen on a number of occasions flitting silently around in the thicker patches of bush.
- Beautiful Flowerpecker *Dicaeum eximium*
Only a brief view of one of the flowerpeckers one early morning. Identification uncertain.
- Black Sunbird *Nectarina sericea*
Often seen foraging round the crowns of coconuts.
- Yellow-breasted Sunbird *Nectarina jugularis*
A few were seen at a lower level than the black variety, mainly round the campus feeding from the flowers of flowering shrubs.
- New Britain Friarbird *Philemon cockerelli*
These noisy birds were often seen in the tall trees round the campus. A nest was observed, but after a while it seemed to be deserted - possibly the nest had been raided by the crows.

- Hooded Mannikin *Lonchura spectabilis*
 Small groups of these were seen on a couple of occasions near patches of cassava plants. Evidently it was the nest building season, as one was carrying nesting material.
- Metallic Starling *Aplonis metallica*
 These were the most common birds of the area, and could often be heard and seen. We saw one large tree where they had a nesting colony.
- Yellow-faced Myna *Mino dumontii*
 Only one pair was seen the whole time we were there. I thought they would have been more common.
- Spangled Drongo *Dicrurus hottentottus*
 Seen fairly often.
- Torresian Crow *Corvus orru*
 These were rather plentiful, and very noisy. Indeed they seemed to make more noise than any group of crows I have seen before, and it was different from the usual crow noises. They were fond of perching on the tops of the taller trees on the campus.

Peckover, W.S. & L.W.C. Filewood. 1976 **Birds of New Guinea and Tropical Australia**. A.H. & A.W. Reed

Address: 172 Harbord Street, Bonnells Bay, New South Wales 2264, Australia

Helmeted Friarbird *Philemon buceroides* feeding on red ants. Len Tolhurst. On 10 October 1990 at the Pacific Adventist College, NCD, I noticed Helmeted Friarbirds feeding on red ants. The red ants had formed several nests by pulling together leaves of a golden shower tree *Cassia fistula*. The friarbirds flew up to the nests and picked off ants while hovering for a second or so in mid-air, then returned to a branch where they perched and swallowed the ants they had observed. Address: Pacific Adventist College, Private Mail Bag, Boroko, N.C.D.

Pheasant Coucal *Centropus phasianus* attacking birds caught in a mist net. Roger K. Hicks and Robin Restall. On 17 July 1990 we visited the Pacific Adventist College (PAC), National Capital District, in the hope of catching some Mannikins *Lonchura* spp. We set a 20 m, 4 panel mist net at a site where mannikins had been observed feeding on the ground. We then left the net for an hour. On our return we had caught 12 birds (10 Grey-headed Mannikins *L. caniceps* and 2 Chestnut-breasted Mannikins *L. castaneothorax*). Two Pheasant Coucals had been attracted to the net, presumably by the flutterings of the trapped mannikins. One of the coucals was actually in the net but escaped as we approached. It had attacked and killed two juvenile Grey-headed Mannikins by pecking at the head and neck, but had not been able to get the mannikins out of the net. After extracting the birds we again left the net. RR returned after about half an hour. We had caught no more birds, but a Pheasant Coucal was sitting close by the net where it was apparently visible to the mannikins as these were now flying higher than they had earlier and so missed the net. Previously, RH had noted Pheasant Coucals sitting under mist nets set in his garden on Matirogo Point, Port Moresby, but no birds had been found dead in the nets. Address: (Hicks) 7 Newtown, Codicote, Herts, SG4 8UG, U.K.; (Restall) 31 South Bay Road, Hong Kong.

Brahminy Kite *Haliastur indus* fishing? Roger K. Hicks. Since January 1990 I have regularly recorded an adult and immature Brahminy Kite on my Town Bird Survey site at Matirogo Point, Port Moresby, National Capital District. Over this time the immature has been slowly obtaining its adult plumage and now only has some flecks of white in the rufous of the upper wing. North of Matirogo Point, a stream flows into a small, unnamed bay and at low tide flows across the exposed mudflats. At 11:05 on 17 September 1990, when the tide was half out, these two Brahminy Kites were seen bathing in the stream. They stood within two feet of each other, in water that was almost belly-deep. After about 5 minutes, the immature flew c.10 m to a rock, on which it perched. The adult remained in the water and began, apparently, to fish. It waded c.30 m through the shallows of the stream, stopping frequently. During the stops it occasionally stabbed at something on or in the water. It made a total of six stabs in seven minutes. Each stab seemed to be successful, although the distance from my vantage point to the bird, c.150 m, was too great for the prey to be discernible. The stabbing action it used for "fishing" was of too short a duration for the

bird to have been drinking. After seven minutes wading the adult Brahminy Kite flew and landed near the immature. The immature took off immediately, circled the bay and was then joined by the adult. Rand & Gilliard (1967, *The Handbook of New Guinea Birds*) recorded one Brahminy Kite that had eaten many small fish, but considered they may have been carrion. Coates (1985, *The Birds of Papua New Guinea. Vol 1.*) reports that Brahminy Kites are expert at snatching fish from just below the surface, but there are no PNG records of Brahminy Kites fishing in the manner described above. *Address: 7 Newtown, Codicote, Herts SG4 8UG, U.K.*

Birds feeding on Hawk Moths. Roger K Hicks. Throughout the period just before the onset of the wet season large numbers of Hawk Moths (and other insects) are attracted to the security lights around my house on Matorogo Point, Port Moresby, National Capital District. During the day these Hawk Moths "roost" in nearby trees, usually under a leaf, or in the shaded nooks on the outside of the house. In the third week of December 1990, when conditions were hot, humid and calm, numerous Hawk Moths of two species were noted around the house. This abundance of prey was exploited by several species of birds. A family of Torresian Crows *Corvus orru*, two adults and two fledged young, visited the roof of the house each morning between 05:30 and 07:30. The young were readily identified by their dark eyes and pinkish gape. I assume all the birds were feeding on insects that had been attracted by the security lights but the prey was only identified on three occasions. Each of these times a young bird was noted holding a Hawk Moth in its bill. The young bird transferred the Hawk Moth from its bill to its feet where it was held against the bird's perch while the Hawk Moth's wings were stripped and discarded before the body was eaten. On one occasion the Hawk Moth escaped while the young Torresian Crow was transferring it from bill to foot. Two Pheasant Coucals *Centropus phasianus*, not usually recorded in the garden, were observed in trees near the house where the Hawk Moths "roosted", but I could not confirm they were feeding on the moths. They were noted on the ground beneath the security lights where they fed on Hawk Moths that had come to grief during the night. Up to four White-breasted Wood-Swallows *Artamus leucorhynchus* snatched moths from trees near the house. The wood-swallows picked the moths, and other insects, from the foliage with their feet as they flew past. Their prey was then manipulated and passed from feet to bill while in flight. Some of the moths taken in this way may have been Hawk Moths, but I cannot be certain and most seemed too small. A dragon *Lophognathus temporalis* was also noted feeding on damaged Hawk Moths on the ground. *Address: 7 Newtown, Codicote, Herts, SG4 8UG, U.K.*

RECENT OBSERVATIONS JULY - SEPTEMBER 1990

COMPILED BY ROGER HICKS

All observations refer to the Port Moresby area unless the site name is followed by an abbreviated province name.

Contributors: Ian Burrows (IB); Field Guides Incorporated tour group (FGI); Mike Hopkins (MH); Roger Hicks (RH); Edel Kraayo (EK); John Silcock (JS); Geoff Smith (GS); Len Tolhurst (LT); Niklas Wahlberg (NW).

Abbreviations: ad = adult; bp = breeding plumage; Cen = Central Province; CGO = Central Government Offices; EHP = Eastern Highlands Province; ESP = East Sepik Province; Fm = Farm; I = Island; imm = immature; juv = juvenile; L = Lake; Mad = Madang Province; Mor = Morobe Province; NP = National Park; NSP = North Solomons Province; Oro = Northern Province; PAC = Pacific Adventist College; R = River; Rd = Road; SHP = Southern Highlands Province; SP = settling ponds; UPNG = University of PNG campus; Wes = Western Province; WHP = Western Highlands Province.

Dwarf Cassowary	<i>Casuaris bennetti</i>
28 Sep, 1 ad and a third-grown young, Varirata Lookout trail, Varirata NP (RH).	
Australasian Grebe	<i>Tachybaptus novaehollandiae</i>
28 Sep, 2 full-grown imm, PAC (RH).	
Little Grebe	<i>Tachybaptus ruficollis</i>
1 Jul, 2 in bp, Alexishafen ponds, Mad (RH).	
Great Frigatebird	<i>Fregata minor</i>
9 Sep, 1 male & 1 female, with Lesser Frigatebirds, flying south over Papa (RH).	
Lesser Frigatebird	<i>Fregata ariel</i>
9 Aug, 3, Loloata I (EK); 9 Sep, c.15, flying south over Papa (RH).	
Great Cormorant	<i>Phalacrocorax carbo</i>
16-19 Aug, 1, Bensbach, Wes, (FGI).	
Great-billed Heron	<i>Ardea sumatrana</i>
16-19 Aug, 1-2, Bensbach, Wes (FGI).	
Cattle Egret	<i>Egretta ibis</i>
2 Jul, c.20, Madang airport, Mad (RH); 9 Sep, c.100, with cattle, Fairfax grasslands (RH).	
White-faced Heron	<i>Egretta novaehollandiae</i>
17 Sep, 1, Rouna No. 3 Power Station, the only record of the year so far (RH).	
Sacred Ibis	<i>Threskiornis aethiopicus</i>
28 Sep, 1, Ilimo Fm (RH).	
Black-winged Kite	<i>Elanus caeruleus</i>
10 Aug, 1, Mount Hagen airfield, WHP (FGI).	
Black Kite	<i>Milvus migrans</i>
31 Jul, 1, Ilimo Fm (NW).	
Spotted Marsh Harrier	<i>Circus spilonotus</i>
11 Aug, 1, Tari Gap, SHP (EK).	

- Grey Goshawk
30 Jul, 1, Tabubil, Wes (JS); 2 Sep, 1 dark phase, Ower's Corner (NW).
Accipiter novaehollandiae
- Meyer's Goshawk
1-5 Aug, 3 light phase birds at 3 different localities in Tari area, SHP (FGI).
Accipiter meyerianus
- New Guinea Harpy-Eagle
14 Aug, 1, Tari Gap, SHP (NW).
Harpyopsis novaeguineae
- Australian Kestrel
15 Aug, 1, nr Daru airport, Wes (FGI); 9 Sep, 1 female, Fairfax grasslands - first record in Port Moresby area for some time (RH).
Falco cenchroides
- Australian Hobby
19 Aug, 1, PAC (RH & LT).
Falco longipennis
- Green Pygmy-Goose
17 Jul, 2 in moult, PAC (RH).
Nettapus pulchellus
- Brown Quail
2 Sep, 3 coveys of 8, 5 & 6 birds, flushed, Ower's Corner Rd (NW).
Coturnix australis
- Chestnut Forest-Rail
1-5 Aug, 1 male watched foraging in cloud forest, Tari Gap, SHP (FGI).
Rallina rubra
- Bush-Hen
26 Aug, 2 ad & 1 half-grown juv seen well, at edge of lakes, Varirata NP (NW).
Amaurornis olivaceus
- Dusky Moorhen
28 Sep, 1 with 1 large young, PAC (RH).
Gallinula tenebrosa
- Comb-crested Jacana
28 Sep, 1 half-grown young which swam between lily pads, PAC (RH).
Irediparra gallinacea
- Australian Pratincole
7 Aug, Kiunga airstrip, Wes; 15 Aug, Daru airstrip, Wes; 16-19 Aug, Bensbach floodplain, Wes; all observations of scattered individuals or pairs (all obs FGI).
Siltia isabella
- Ruddy Turnstone
15 Aug, 1, Daru, Wes (FGI).
Arenaria interpres
- Eastern Curlew
15 Aug, 2, Daru, Wes (FGI).
Numenius madagascariensis
- Whimbrel
11 Sep, not positively identified, but size and shape suggest this species. The first record of migrants returning from the north in the Lae area (GS).
Numenius phaeopus
- Wood Sandpiper
17 Sep, 1, Moitaka SP (RH).
Tringa glareola
- Common Greenshank
17 Sep, 1, Moitaka SP (RH).
Tringa nebularia
- Curlew Sandpiper
22 Sep, 1, Moitaka SP (RH); after no records at all for this species in 1989.
Calidris ferruginea
- Rufous Woodcock
1-5 Aug, 1 seen briefly, in moss forest, Tari Gap, SHP (FGI); 11 Aug, 1, Tari Gap, SHP (EK).
Scolopax saturata
- Whiskered Tern
16 Sep, c.80, Moitaka SP (RH).
Chlidonias hybrida
- Gull-billed Tern
9 Sep, 1, L Iaraguma (RH); 16 Sep, 6, Moitaka SP (RH).
Gelochelidon nilotica
- Common Tern
9 Aug, 4, Loloata I (EK).
Sterna hirundo

- Great Cuckoo-Dove
16-19 Aug, 2, Bensbach area, Wes (FGI). This is the second recent record from the Trans-Fly for this species (the other was in Dec '89). It was not previously thought to occur there (Coates 1985).
Reinwardtoena reinwardtii
- Thick-billed Ground-Dove
16 Aug, 1, flushed from ground and walking away hurriedly, Varirata NP (FGI). This is the first record for Varirata National Park.
Gallilumba salamonis
- Wompoo Fruit-Dove
17 Sep, 1 incubating 1 egg in a flimsy nest, Varirata NP (MH).
Ptilinopus magnificus
- Orange-bellied Fruit-Dove
3 Aug, 1, Karawari Lodge, ESP (EK).
Ptilinopus iozonus
- Papuan Mountain Pigeon
30 Jul, 30+, requiring avoiding action by helicopter, nr Ningerum, Wes (JS).
Gymnophaps albertisii
- Red-flanked Lorikeet
7-9 Aug, 1 female carrying nesting material, Kiunga, Wes (FGI).
Charmosyna placentis
- Little Red Lorikeet
1 Jul, a feeding party of c.12 (with Rainbow Lorikeets, Red-flanked Lorikeets, Double-eyed Fig-Parrots, Papuan Black Myzomela and Tawny-breasted Honeyeaters) nr the Raggiana Bridge on the Gawam Rd, Mor. This is at an altitude of c.3-400 m, c.250 m lower than this species' normal range and the first record for this area (GS).
Charmosyna pulchella
- Papuan Lorikeet
13 Aug, feeding *Schleffera* sp., Tari Gap, SHP (NW).
Charmosyna papou
- Palm Cockatoo
17-19 Aug, 1 female along Bensbach R and 1 male nr Wando, Wes (FGI).
Probosciger aterrimus
- Little Corella
17-19 Aug, at least 1, nr Wando, Wes (FGI).
Cacatua pastinator
- Sulphur-crested Cockatoo
30 Jul, 2, Tabubil, Wes & considerable numbers seen from helicopter between Tabubil & Kiunga, Wes, most nr Kiunga (JS).
Cacatua galerita
- Double-eyed Fig-Parrot
1 Jul, nr Raggiana Bridge on the Gawam Rd, Mor (GS).
Cyclopsitta diophthalma
- Large Fig-Parrot
7-9 Aug, Kiunga, Wes (FGI).
Psittaculirostris desmarestii
- Brehm's Tiger-Parrot
14 Aug, 1 male, Tari Gap, SHP (NW).
Psittacella brehmii
- Blue-collared Parrot
5 Aug, Talair Twin Otter nearly collided with a flock of c.300 m above valley, nr Tabubil, Wes (FGI); 2 Sep, a few, Ower's Corner (NW).
Geoffroyus simplex
- Vulturine Parrot
31 Jul, 2, flying over Tabubil township, Wes (JS).
Psitttrichas fulgidus
- Papuan King-Parrot
2 Sep, 5, Ower's Corner (NW).
Alisterus chloropterus
- Channel-billed Cuckoo
7-9 Aug, Kiunga, Wes (FGI).
Scythrops navaehollandiae
- Marbled Frogmouth
16 Aug, Varirata NP (FGI).
Podargus ocellatus
- Papuan Frogmouth
19 Aug, pr nesting in same place as earlier this year, PAC (LT).
Podargus papuensis

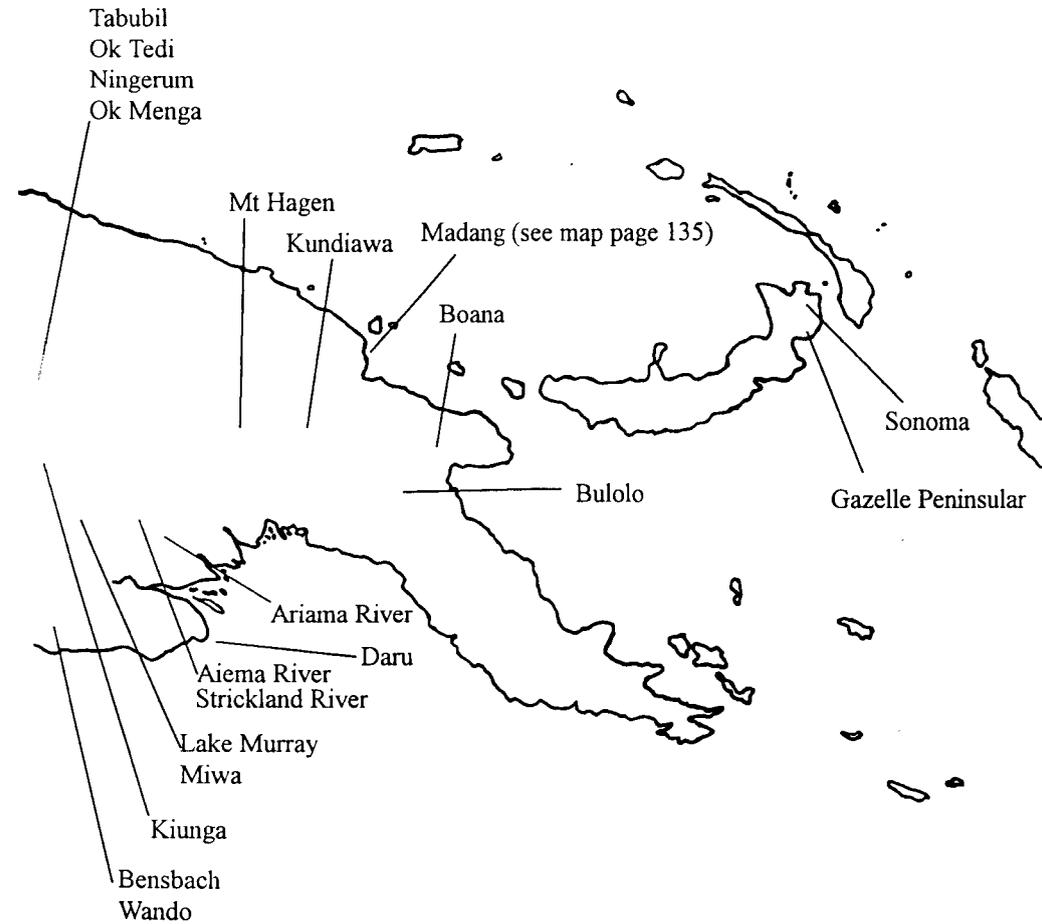
White-throated Nightjar 16-18 Aug, 2-3 seen each evening, Bensbach, Wes (FGI).	<i>Eurostopus mystacalis</i>
Papuan Spine-tailed Swift 2 Sep, Macdonald's Corner (NW).	<i>Mearnsia novaeguineae</i>
Moustached Tree-Swift 5-7 Aug, common, Ok Tedi valley, Wes (FGI).	<i>Hemiprocne mystacea</i>
Sacred Kingfisher 31 Jul, 1 juv, very definitely brown/buff shading with blue-green coming through on the head, Tabubil, Wes (JS); 5 Aug, 1, Karawari R, ESP (EK).	<i>Halcyon sancta</i>
Beach Kingfisher 1 Jul, 1, CRI, Madang, Mad (RH).	<i>Halcyon saurophaga</i>
Blue-tailed Bee-eater 19 Aug, > 6 nest burrows on building site at PAC (LT & RH).	<i>Merops ornatus</i>
Blyth's Hornbill 30 Jul, 2, seen separately from helicopter, c.20 km S of Tabubil, Wes (JS); 4 Aug, 2, flying across river, nr Arafundi, ESP (EK).	<i>Rhyticeros plicatus</i>
Blue-breasted Pitta 29 Jul, 1 imm, Circuit trail, Varirata NP (JS).	<i>Pitta erythrogaster</i>
Noisy Pitta 17-19 Aug, several heard and 1 seen briefly, Bensbach, Wes (FGI).	<i>Pitta versicolor</i>
Pacific Swallow 26 Aug, flooding of basement at CGO Waigani by faulty air-conditioning unit and subsequent pumping out has meant there is a lot of standing water around the office. The Pacific Swallows have taken advantage of this and are collecting mud to build nests. Currently 5 being built on CGO (RH); 16 Sep, 1, fledged juv with yellow gape, Moitaka SP (RH).	<i>Hirundo tahitica</i>
Tree Martin 11 Aug, Nadzab, Mor (FGI); 17-19 Aug, Bensbach R, Wes (FGI); 9 Sep, c.20, L Iaraguma (RH); 16 Sep, c.30, Moitaka SP (RH).	<i>Hirundo nigricans</i>
Richard's Pipit 20 Aug, 1, Kundiawa airfield, Sim (NW).	<i>Anthus novaeseelandiae</i>
Cicadabird Aug, heard at Tabubil and Kiunga, Wes, Wau, Boana and Lae, Mor, and Varirata NP before being seen at Bensbach, Wes (FGI).	<i>Coracina tenuirostris</i>
Golden Cuckoo-Shrike 30 Jul, seen from helicopter, nr Ningerum, Wes (JS).	<i>Campochaera sloetii</i>
Papuan Whipbird 1-5 Aug, 1, possibly 2, Tari Gap, female-plumaged birds seen well by Jan Pierson (of FGI) and well enough to preclude anything known to occur in the mountains of PNG by Brett Whitney (also of FGI). The bird(s) was invariably on the ground or on branches in contact with the ground. It held its tail raised above the body and waved it around expressively (FGI).	<i>Androphobus viridis</i>
Painted Quail-Thrush 10 Aug, 1 male, Varirata NP (NW).	<i>Cinlosoma ajax</i>
Lesser Melampitta 16 Aug, 3, Tari Gap, SHP (NW).	<i>Melampitta lugubris</i>
Tawny Grassbird 30 Jul, at c.2000m, top of Ok Tedi mine site, Wes (JS).	<i>Megalurus timoriensis</i>

Wallace's Fairy-Wren 5-7 Aug, pair foraging in undergrowth near forest edge, Tabubil, Wes (FGI).	<i>Sipodotus wallacii</i>
Orange-crowned Fairy-Wren 14 Aug, small party, below Bailey bridge, Tari Gap, SHP (NW).	<i>Clytomyias insignis</i>
Golden Monarch 25 Aug, 1 male, Musgrave R (NW).	<i>Monarcha chrysomela</i>
Broad-billed Flycatcher 15 Aug, a <i>Myiagra</i> flycatcher, seen in the mangroves at Daru, Wes, was probably this species (FGI).	<i>Myiagra ruficollis</i>
Restless Flycatcher 17-19 Aug, 1 pair, seen well, Bensbach R, Wes (FGI).	<i>Myiagra inquieta</i>
Jacky Winter 9 Sep, 3, L Iaraguma.	<i>Microeca leucophaea</i>
Lemon-bellied Flycatcher 25 Aug, nesting in Subitana rubber plantation (NW).	<i>Microeca flavigaster</i>
Yellow-legged Flycatcher 8 Aug, Varirata NP (NW).	<i>Microeca griseiceps</i>
Garnet Robin 16 Aug, 1 male, Tari Gap, SHP (NW).	<i>Eugerygone rubra</i>
White-winged Robin 13 Aug, pair seen well in Wau-Bulolo area, Mor (FGI).	<i>Paneothello sigillatus</i>
Mottled Whistler 5-7 Aug, 1, at c.1300 m, nr Tabubil is the lowest record to date (FGI).	<i>Rhagologus leucostigma</i>
Mangrove Golden Whistler 15 Aug, mangroves at Daru, Wes (FGI).	<i>Pachycephala melanura</i>
Sclater's Whistler 12 Aug, 1 male, Ambua Lodge, Tari, SHP (NW).	<i>Pachycephala soror</i>
Rufous Whistler 29 Jul, Varirata NP (JS).	<i>Pachycephala rufiventris</i>
Black Sittella 13 Aug, large flock, nr Bailey bridge, Tari Gap, SHP (NW).	<i>Daphoenositta miranda</i>
Obscure Berrypecker 2 Sep, a female-plumaged berrypecker with yellow pectoral tufts, tail unfortunately not seen, may have been this species, Ower's Corner (NW).	<i>Melanocharis arfakiana</i>
Streaked Berrypecker 13 Aug, Ilaru pass, Mor (FGI).	<i>Melanocharis striativentris</i>
Spotted Berrypecker 13 Aug, pr, Ilaru pass, Mor (FGI).	<i>Rhamphocharis crassirostris</i>
Yellow-bellied Sunbird 9 Sep, pr nest building, female seen carrying nesting material while male stayed nr nest, Papa (RH).	<i>Nectarinia jugularis</i>
Pygmy Honeyeater 25 Aug, many in an <i>Albizia</i> tree, Musgrave R (NW); 26 Aug, several, Boundary trail, Varirata NP (NW).	<i>Oedistoma pygmaeum</i>
Red Myzomela 25 Aug, 1 male, feeding in <i>Albizia</i> tree, Musgrave R (NW).	<i>Myzomela cruentata</i>
Red-headed Myzomela 15 Aug, in mangroves, Daru, Wes (FGI).	<i>Myzomela erythrocephala</i>
Obscure Honeyeater 7-9 Aug, Kiunga, Wes (FGI).	<i>Lichenostomus obscurus</i>

Spotted Honeyeater 25 Aug, 2 in <i>Albizia</i> tree, Musgrave R (NW)	<i>Xanthotis polygramma</i>
Sooty Melidictes 14 Aug, 1, Tari Gap, SHP (NW)	<i>Melidictes fuscus</i>
Brown-backed Honeyeater 9 Sep, pr nest building, L Iaraguma (RH)	<i>Ramsayornis modestus</i>
Grey-headed Mannikin 15 Jul, many juv, PAC (EK); 17 Jul, many juv & 1 ad carrying nesting material, PAC (RH)	<i>Lonchura caniceps</i>
Chestnut-breasted Mannikin 17 Jul, many juv, PAC (RH)	<i>Lonchura castaneothorax</i>
Mountain Firetail 11 Aug, 1, Tari Gap, SHP (EK)	<i>Oreostruthus fuliginosus</i>
Crimson Finch 17-19 Aug, flock of ad & imm, Bensbach, Wes (FGI)	<i>Neochmia phaeton</i>
House Sparrow 3 Sep, 2 males & 3 females, feeding on seeding grasses, Waigani (RH); only fifth PNG record for this species with four in last four years.	<i>Passer domesticus</i>
Olive-backed Oriole 17-19 Aug, Bensbach, Wes (FGI)	<i>Oriolus sagittatus</i>
Torrent-Lark 10 Aug, 2, Huli scenic trail waterfall, Ambua Lodge, Tari, SHP (EK)	<i>Grallina bruijni</i>
Great Wood-Swallow 30 Jul, common, Tabubil, Wes (JS); 13 Aug, 1, Banari Rd, nr Tari, SHP (EK)	<i>Artamus maximus</i>
Flame Bowerbird 7-9 Aug, 4 ad males, Kiunga, Wes (FGI)	<i>Sericulus aureus</i>
Crested Bird of Paradise 12 Aug, 1 female, grounds of Ambua Lodge, Tari, SHP (NW)	<i>Cnemophilus macgregorii</i>
Loria's Bird of Paradise 15 Aug, 1 female, Ambua Lodge, Tari, SHP (NW)	<i>Cnemophilus loriae</i>
Short-tailed Paradigalla 15 Aug, 1, Ambua Lodge, Tari, SHP (NW)	<i>Paradigalla brevicauda</i>
Magnificent Riflebird 15 Jul, 1 male, creeping along a tree trunk, Varirata NP (EK); 26 Aug, 1 male, Boundary trail, Varirata NP (NW); 2 Sep, 1 male on dead tree, Ower's Corner (NW)	<i>Ptiloris magnificentus</i>
Black Sicklebill 13 Aug, 1 male, Banari Rd, nr Tari, SHP (NW & EK)	<i>Epimachus fastosus</i>
Grey Crow 30 Jul, c 6, Ok Menga dam, Wes (JS); 31 Jul, Lower Ok Tedi bridge, Wes (JS)	<i>Corvus tristis</i>
Torresian Crow 9 Sep, 1 feeding on road-killed Carpet Python, nr Papa (RH)	<i>Corvus orru</i>

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(Additional to those shown on map on page 98 of Muruk 3.2)



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