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DISTRIBUTION AND HABITS OF KITES, *Milvus migrans, Haliastur sphenurus* AND *H. indus* IN PAPUA NEW GUINEA

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Brahminy Kites *Hallastur indus* are present in the highlands as well as in both northern and southern lowlands. Whistling Kites *H. sphenurus* are absent from the highlands whilst Black Kites *Milvus migrans* are inexplicably absent from the southern lowlands. Black Kites have increased in abundance, perhaps replacing Whistling Kites, and have colonized towns, where they feed on the carcasses of the introduced toad *Bufo marinus*. Whistling Kites in Papua New Guinea possibly frequent aquatic habitats more than they do in Australia. Brahminy Kites occur regularly over rainforest canopies far from open spaces, where they hunt for prey, including birds. This is contrary to their behaviour in other parts of their global distribution.

INTRODUCTION

During several residences in Papua New Guinea I noticed that the Black Kite *Milvus migrans*, Whistling Kite *Haliastur sphenurus* and Brahminy Kite *H. indus*, differed in their habits from the same species occurring in Australia. Furthermore, these observations differed from the information given on kites in Papua New Guinea by Rand and Gilliard (1967). My ovbservations, and those reported by members of the Papua New Guinea Bird Society (PNGBS) are presented to illustrate these differences.

DISTRIBUTION AND ABUNDANCE

Table 1 shows the status of kites in parts of Papua New Guinea, based on long-term (i.e. > 1 month) expeditions. Localities mentioned are shown in Figure 1. Although the Black Kite was always abundant in the highlands, it was apparently not abundant in northern lowlands of Papua New Guinea before at least 1958 and was virtually absent from the southern lowlands. So conspicuous is the species that the major ornithological expeditions should not have failed to notice it. The Whistling Kite was common in lowlands on both sides of the main cordillera but was absent from the highlands. The Brahminy Kite was present in all areas but was usually less numerous than the other two species.

In 1979 I circulated a questionnaire among members of the PNGBS on the abundance of birds in urban areas. Table 2 shows the abundance of kites, in mainland Papua New Guinea, together with the highest incidence recorded for each town. The Black Kite is clearly the most abundant species in towns of the northern low-

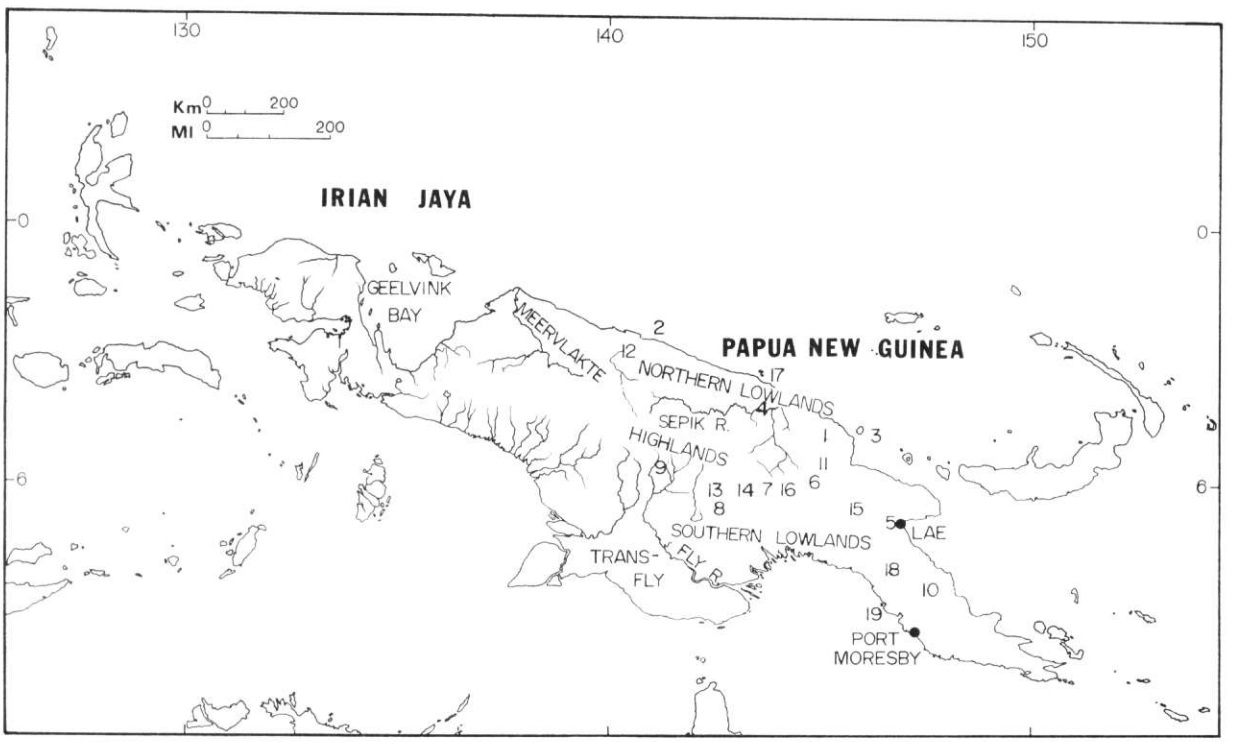

Figure 1. *Papua New Guinea, showing localities mentioned in text.* (*Key*:

1 Adelbert Range
2 Humboldt Bay
3 Madang
4 Maprik
5 Markham Valley
6 Goraka
7 Mount Hagen
8 Nomad River
9 Ok Tedi River
10 Popondetta
11 Ramu Valley
12 Sentani
13 Strickland River
14 Tari
15 Ukarumpa
16 Wahgi Valley
17 Wewak
18 Woitape
19 Yule Is.)

lands and the highlands, but it is virtually absent from the southern lowlands. Indeed, the data for Port Moresby refer to a single pair, which frequented the docks for about a decade and then disappeared. The Whistling Kite is a reasonably common town bird in the north, although it is less so in the south and is absent from towns in the highlands. The Brahminy Kite appears to be reasonably common in towns throughout all areas. It is present in at least five towns located some distance from either the coast or large rivers.

Table 3 summarizes all sightings (each consisting of one or more birds) of kites given in the PNGBS Newsletter from 1966 to 1982 inclusive. These confirm the absence of the Whistling Kite from the highlands. However, they show a high proportion of occurrences of the Black Kite in the southern lowlands. This probably reflects the noteworthiness of any such occurrence and its reporting to the monthly meetings held at Port Moresby. Sightings made in reports from the monthly excursions at Port Moresby give a more balanced picture of the Black Kite's true status there, being a rare vagrant.

The abundance of each species is hard to evaluate, because all three have a propensity to congregate quickly at an ephemeral source of food. Mackay (1980), at Baiyer River near Mount Hagen in the highlands, recorded 120 Black Kites in a single flock. I have observed

TABLE 1

Recorded status of kites in areas of Papua New Guinea covered in the literature.

Area	Reference	Black Kite	Whistling Kite	Brahminy Kite
Northern lowlands				
Sepik River	Gilliard and LeCroy (1966)	Uncommon	Common	Absent
Sentani	Rand (1942b)	Local	Present	Common
Meervlakte	Rand (1942b)	Absent	Common	Uncommon
Highlands				
Wahgi Valley	Mayr and Gilliard (1954)	Common	Absent	Occasional
	Glydenstolpe (1955)	Common	Absent	Occasional
Wahgi/Karimui	Diamond (1972)	Abundant	Absent	Common
Baiyer River	Mackay (1980)	Abundant	Absent	Common
Southern lowlands				
Fly River	Mayr and Rand (1937)	Absent	Abundant	Uncommon
	Rand (1942a)	Absent	Common	Present
Ok Tedi River	Bell (1969)	2 seen	1 seen	5 seen
Nomad River	Bell (1970)	Absent	1 seen	Common
Port Moresby	Mackay (1970)	Uncommon*	Abundant	Common

*: refers to the single pair at the docks.

at Lae; flocks of up to fifty birds congregating at grass fires in the Markham Valley; a flock of seventy feeding on flood debris and forty birds perched together in the town itself. On 4 April, 1970, I counted (between 06:00-06:30), 200+ individuals flying into Lae from the adjacent grasslands.

Similarly, the Whistling Kite will congregate at grass fires, and at carrion or swarms of flying insects. Gilliard and LeCroy (1966) recorded flocks of over thirty at Lae, gathering at insect swarms and around refuse. I have seen forty perched on trees at Moitaka, a sewerage pond, near Port Moresby, overlooking pools containing dying fish. Mayr & Rand (1937), in the Trans-Fly region, saw flocks gathering at carcasses of the Agile Wallaby *Wallabia agilis*. Finch (1980) found it 'incredibly abundant' in the Trans-Fly. This agrees with my observations. The Brahminy Kite seems to flock less often but I observed thirty-five birds at a swarm of flying insects at Moitaka, and then forty Whistling Kites at a swarm on the same spot a few weeks later Table 4 shows the mean number of kites seen each month in regular visits, usually weekly, to Moitaka from May, 1975 to November, 1976. These data suggest that the Whistling Kite was more abundant in this open area adjacent to a maze of swamps and lagoons. The two species have been observed to clash with each other occasionally. Five times I saw a single Brahminy Kite chase a Whistling Kite and once saw the reverse when a single Brahminy Kite approached a flock of Whistling Kites.

HABITAT

Black Kites from my observation seem to be most abundant in treeless grasslands in Papua New Guinea, notably the Sepik Plains, the Markham and Ramu Valleys, and the highlands. They are virtually absent from the extensive natural savannas of southern Papua New Guinea, where the habitat appears typical of that where the species is numerous in Australia. They appear much less suited to aquatic habitats than the other two species. Gilliard and LeCroy (1966) recorded a few along the Sepik River but found Whistling Kites abundant. I have rarely seen Black Kites over seashores, lagoons or large rivers.

Although respondents to the questionnaire on urban birds (Table 2) reported the species in towns, most remarked that it merely flew over,

TABLE 2

Abundance of kites in urban areas of Papua New Guinea, as given by respondents to questionnaire (A: "can see it any time"; B: "can usually find it if I look hard"; C: "sometimes it is there"; D: "only a few records". Criterion for "urban": within 100 m from street lights).

Town	Black Kite	Whistling Kite	Brahminy Kite
Northern lowlands			
Wewak (a)	B		C
(b)			C
Maprik*	B		
Madang (a)*	A	C	A
(b)		C	
(c)	D		C
(d)		C	
Lae (a)*	A	B	C
(b)*	A	B	C
(c)*	A	C	
Popondetta*	A	C	
Highlands			
Ukarumpa*	A		B
Mount Hagen (a)*	C		D
(b)*	C		
Goroka (a)	C		
(b)	C		D
Southern lowlands			
Port Moresby (a)*		D	C
(b)*	D+	C	C
(c)*	D+	D	C
(d)*		D	C

*: data from long-term (> 1 year) resident.
+: one pair only.

implying that it was not commensal with Man in the way that it is in urban areas of Africa and Asia. However, in the town of Lae it became a truly urban bird between 1971 and 1973. The Cane Toad *Bufo marinus,* introduced into Papua New Guinea (Pippet 1975), was abundant in areas of high rainfall, particularly Lae (mean annual rainfall: 4 617 mm). It was impossible to drive 100 m at night without squashing one or more toads, yet by 08:00 hours each morning all carcasses had disappeared. At 06:00 hours on 4 April, 1970, I witnessed hundreds of kites streaming into the town from the Markham Valley, to feed on the remains of the toads.

During 1969-71, only one pair of Black Kites was resident at Igam Barracks, Lae. This pair nested in 1970, rearing their nestlings on what appeared to be a diet solely of road-squashed toads, judging from the remains under the nest site. Later, during February, 1977, I counted forty-six Black Kites, either feeding on locusts on the grassed parade grounds, or perched nearby on a remnant stand of rainforest trees in the centre of the barracks. On the same day, in the town centre, I found the species in groups of up to ten birds feeding on playing fields and grassed runways, apparently very much in permanent occupation.

TABLE 3

Records of kites in PNGBS Newsletter 1965-82.

Area	Black Kite	Whistling Kite	Brahminy Kite
Northern lowlands	2	6	8
Highlands	9		10
Southern lowlands	13	35	73
Excursion reports of PNGBS at Port Moresby	2	29	37

Whistling Kites occur in any open area, especially near water, throughout lowland Papua New Guinea. They seem to be much more numerous along sea coasts than in Australia. They occur in towns but less so than Black or Brahminy Kites (Table 2). Gilliard and LeCroy (1966) described flocks roosting and feeding in the town of Lae in 1958, but during eighteen months residence there I never saw a flock of Whistling Kites inside the town limits. They are most numerous in the savannas of the Trans-Fly (Mayr and Rand 1937; Rand 1942a; Finch 1980; pers. obs.). This is the only part of Papua New Guinea with abundant large grazing mammals; the exotic Rusa Deer *Cervus rusa*, which is undergoing a population explosion (Bentley and Downs 1968), and the Agile Wallaby. Both of these animals are absent from the extensive northern grasslands. The large build-up in numbers of animals in the Trans-Fly, and the low hunting pressure because of sparse human settlement, would make the incidence of large carcasses quite high. Mayr and Rand (1937) implied that abundance of Whistling Kites was related to that of the Agile Wallaby. Another factor contributing to its abundance is the introduced African fish *Tilapia mossambica*. The Whistling Kite is adept at taking live *Tilapia* (Bell 1967) and in August 1975 I saw a pair at Moitaka feeding nestlings wholly on live-taken *Tilapia*.

TABLE 4

Mean number of kites seen, by months, during visits to Moitaka sewerage works, Port Moresby, May 1975-November 1976.

Month	Whistling Kite	Brahminy Kite
May 1975	4.5	0.5
June	5.0	0.5
July	2.5	1.0
August	1.5	1.0
September	2.0	1.2
October	1.0	17.2
November	0.5	12.5
December	0.5	0.5
January 1976	40.0	1.0
February	No visits	
March	6.3	4.6
April	2.5	5.5
May	0.5	0.5
June	6.0	2.0
July	No visits	
August	2.0	0.7
September	2.0	—
October	2.0	—
November	1.0	0.7

TABLE 5

Observations of food seen taken or attempted to be taken by kites.

Type of Food	Black Kite	Whistling Kite	Brahminy Kite
Live birds		1	3
Live mammals			3
Live reptiles		1	2
Live fish		6	1
Insects — flying	7	3	2
— in foliage			1
— on ground	10		2
Road kills — toads	30		4
— unspecified	2	6	7
Other carrion	3		
Totals	52	17	25

The Brahminy Kite in Papua New Guinea appears to occur in habitats that are not normally frequented elsewhere in its range from India to south-eastern Australia. Gilliard and LeCroy (1967) appear to be the first to note that it frequents rainforests far from open spaces and waterways — 'not uncommon over ridges and gorges of the Adelbert Region, far from water'. The Adelbert Ranges, near Madang are covered by virtually continuous rainforest. Recently Morris (1980, 1981) observed Brahminy Kites taking prey from the canopy of rainforest in Australia. Likewise I have regularly seen the species hunting over the canopy of rainforest in Papua New Guinea, often distant from any open space.

From 1965 to 1968 I spent over 300 hours as a passenger in Army light aircraft over the Fly-Strickland area. Brahminy Kites were easy to locate, even at considerable distance, because their bright colours contrasted with the canopy below. It was rarely possible to look out from one side of the aircraft and not see a Brahminy Kite over the rainforest. After the first such observation I kept special watch for the species. Some of the places where I saw the species were 20 km or more from any open space.

FOOD

Table 5 gives the types of food that I observed kites taking in Papua New Guinea. It should be noted that the table may not be a true indication of food preferences. The high incidence of toads in the observed diet of Black Kites was because I lived in an area where *Bufo marinus* was abundant. The incidence of observations of road-killed toads being taken by the Brahminy Kite is related to my regularly driving along a road inside rainforest, where the other two species did not occur.

The Black Kite was regularly seen taking flying insects as it does everywhere (e.g. Brown and Amadon 1968). At Lae, it frequented areas of mown grass, where it fed on the ground on what apeared to be locusts.

The constant supply of road-killed toads is a major source of food for Black Kites in Papua New Guinea. Surprisingly, the species does not yet exploit toads in Queensland, where they are abundant. Neither F. T. Morris, studying raptors, nor E. van Beurden, studying the predators of toads, have seen kites taking toads (pers. comm.). There is one report (Covacevich and Archer, 1975) of a 'Kite Hawk' in Queensland following a tractor and taking live toads disturbed by the machine. The skin of the toad is highly toxic to most mammals and reptiles and at least some birds (Covacevich and Archer 1975). However, the Nutmeg Mannikin *Lonchura punctulata* has been observed eating dried and powdered toad remains on road surfaces (M. Cassels, cited in Bell 1965), although it is not known whether it survived. Similarly, Cassels (1970) reported in Common Koel *Eudynamys scolopacea* repeatedly taking small live toads, and both Frauca (1974) and E. van Beurden (pers. comm.) have seen crows *Corvus* sp. eating road-killed toads. In all cases the birds opened the toads from the ventral surface and took the viscera. The toad remains that I found under the nest of the Black Kites at Lae had been opened from the ventral surfaces, with the dorsal skin and skeletons left intact. It seems likely that the kites avoided the toxic parts of the toads' body.

The food taken by the Whistling Kite in Papua New Guinea seems to accord with its habits in Australia, except perhaps for its frequency of taking live fish. Except at road-kills, Whistling Kites were rarely seen to feed on the ground as did the Black Kite, but preferred to snatch their food in flight and either took it to a perch or ate it on the wing.

The Brahminy Kite however, showed considerable divergence from the generally accepted view that it favours carrion (Readers Digest, 1976). On five occasions I saw Brahminy Kites take live vertebrates from the ground, two of which were mammals of at least the size of full-grown *Rattus rattus*. These larger prey were carried to a perch but a mouse-sized animal was eaten in flight, the bird alternately flapping its wings and gliding, tearing at the prey whilst gliding. In Australia (Mayne Junction, Brisbane, 1 July, 1956) I had seen a Brahminy Kite trying to strike at domestic fowl inside a netting enclosure.

Brahminy Kites are known to take live animals, but their ability to take them out of the jungle canopy, at least in Papua New Guinea, seems to have been overlooked. Morris (1980, 1981) in North Queensland, recorded the species taking insects and attacking Sulphur-crested Cockatoos *Cacatua galerita* in the canopy of rainforest. The species has been reported (*PNGBS Newsletter* 23: 4) attempting to strike Rainbow Lorikeets *Trichoglossus haematodus,* and collecting insects, both from the rainforest canopy at Tari in the Papua New Guinea highlands. On 29 November 1970, at Rouku Village in the Trans-Fly I saw a Brahminy Kite take a Black Myzomela *Myzomela nigrita* (*ca.* 9 g) from the canopy of a coconut plantation. The coconuts grew close together, forming a dense canopy, and the prey was perched in the lower fronds. The kite dived through the canopy with its wings closed and then flew with remarkable manoeuvrability through the fronds to seize the honeyeater. Similarly, on 24 January, 1976, near Port Moresby, I saw a Brahminy Kite dive into the canopy of a tree and pursue, unsuccessfully, a Rainbow Lorikeet. Twice, on July 26, 1975, near Wewak, I saw a Brahminy Kite close its wings and dive straight down into the canopy, presumably after arboreal prey.

Mr Charles Nicholson (pers. comm.), when District Officer at Woitape, in the south-east highlands, saw a Brahminy Kite take honeyeaters daily, over a period of one week. A flowering Kamerere *Eucalyptus deglupta* outside his house attracted large congregations of honeyeaters and the kite took the honeyeaters out of the foliage. These bird-eating tendencies seem to be confirmed by the reactions of rainforest

birds to Brahminy Kites that I witnessed at Brown River near Port Moresby (Bell 1982). Whilst any raptors aroused alarm when flying beneath the canopy, most did not when flying above it. The Long-tailed Buzzard *Henicopernis longicauda,* Oriental Hobby *Falco severus,* White-bellied Sea-eagle *Haliaeetus leucogaster,* Pacific Baza *Aviceda subcristata* and three species of accipiter aroused little concern when flying over the forest canopy. But the appearance of either the Little Eagle *Hieraaetus morphnoides* or the Brahminy Kite immediately aroused alarm among canopy-feeding species such as lorikeets, birds of paradise, drongoes and pitohuis. It is well known that the Little Eagle regularly eats birds (e.g. Debus 1984); it seems that the Brahminy Kite, at least in Papua New Guinea, does so likewise.

DISCUSSION

Rand and Gilliard (1967) give the Papuan New Guinean range of the Black Kite as eastern Papua New Guinea, west to Yule Island in the south (*ca* 100 km west from Port Moresby) and as far north as Humboldt Bay. The species has been recorded west of these limits (e.g. Bell 1969) and, in view of its wide distribution elsewhere, probably occurs throughout Papua New Guinea but only as a vagrant in the south. Why it should be absent from the southern savannas, a similar habitat to that frequented in Australia, is most puzzling. Rand and Gilliard (1967) describe it as 'usually uncommon or rare' but this is certainly no longer the case in either the highlands or the northern lowlands. It is tempting to speculate that there has been an increase concurrent with that of cattle-grazing since World War II, mainly in the Sepik Plains, Markham and Ramu Valleys, places where Black Kites seem most numerous. Brown and Amadon (1968) describe ideal habitat as 'light woodland, some big trees, plenty of cultivated ground, some open water, and human activity and habitation'.

The Black Kite would seem to have changed its habits at Lae over a short period of time. This is in keeping with its well-known adaptability; such as eating the pericarps of oil-palm fruits in Africa; congregating in a flock of 3 000 at an Australian piggery (Brown and Amadon 1968); using bread as bait to catch fish (Roberts 1982) as well as colonizing Indian cities to a density of one pair per 6.5 ha (Brown 1976). Perhaps the standards of municipal administration prevailing in Papua New Guinea will not provide opportunities for them to reach the plague proportions typical of many cities in Asia. Most references mention the species flying off with small prey snatched from the ground whilst in flight but at Lae they remained on the ground for extended periods waddling after locusts. This may bring them into competition with the Brown Falcon *Falco berigora.*

The distribution of the Whistling Kite in Papua New Guinea is not precisely defined by Rand and Gilliard (1967), although Mayr (1941) defines the western limits as the Trans-Fly in the south and Geelvink Bay in the north. Mayr's range would cover most of the suitable habitat but it would be surprising if the Whistling Kite did not extend further westward, particularly along the sea-coast. Absence from the highlands could relate to the lack of carrion, except that in the northern grasslands, where Gilliard and LeCroy (1966) found it so abundant, large wild animals are also absent. Avoidance of the highlands therefore, may relate to the absence of large waterways. Both Rand (1942b) and Gilliard and LeCroy (1966) found it very abundant on major river systems (the Meervlakte and Sepik River respectively) and the other two kites uncommon or absent. Certainly my own observations suggest it to be most abundant near the coast or large waterways. Amadon (cited in Gilliard and LeCroy 1966) suggested that the Whistling Kite frequented wetter areas than did the Black Kite in Australia.

Gilliard's comments (Gilliard and LeCroy 1966) indicate that in 1958 the Whistling Kite was an abundant town bird in Lae, but by 1970 I found this not to be the case. By the 1970's it was the Black Kite and not the Whistling Kite that formed flocks in the town. Perhaps the Black Kite is either displacing or replacing the Whistling Kite in northern Papua New Guinea, at least in man-made habitats.

The Brahminy Kite's status and range in Papua New Guinea is given by Rand and Gilliard (1967) as 'common in lowlands and rarely up to 7 500 feet'. It is in fact a common bird throughout Papua New Guinea, except in cloud forest and alpine habitats, at least up to 1 800 m (6 000 feet), although it is less common in the highlands than the Black Kite. The species is not largely confined to sea-coasts or waterways as it

is in Australia (Reader's Digest 1976), but, in my opinion is more likely to be found over rainforests far from open spaces. This should not be surprising, since in other parts of its range, such as India, it is commensal with Man and is an abundant urban bird, quite unlike its habits in Australia.

One would not expect, from watching their slow lazy flight, that Brahminy Kites would have either the speed or manoeuvrability to take small birds from inside the rainforest canopy. That they do, and their regular occurrence over rainforest, suggest that the habit is more frequent than the few records indicate. Two reasons are suggested why the species behaves in this way in Papua New Guinea. First, Papua New Guinea seems fairly depauperate in raptors that hunt from above the canopy, as opposed to a wealth of *Accipiter* spp. which usually hunt from a perch inside it. Secondly, the scavenging role of the Brahminy Kite in Asia may be more successfully occupied by the Whistling Kite in Papua New Guinea. The feet of Brahminy Kites would seem unsuited to the role of an active hunter, but appearances can be deceptive as 'supposedly sluggish Chanting Goshawks kill full-grown guinea-fowl and quail in full flight, but from their structure you would hardly conclude that they could perform such feats at all' Brown (1976).

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