I am grateful to Clifford D. Frith for examining this paper and suggesting improvements to its presentation.

Cooper, W.T. & J.M. Forshaw 1977. **The Birds of Paradise and Bowerbirds.** Collins.
Diamond, J.M. 1984. **The Bower Builders.** Discover/Sociobiology U.S.A.
Marshall, A.J. 1954. **The Bower Birds.** Clarendon Press.
Pruett-Jones, S.G. & M. Pruett-Jones, 1986. **National Geographic Research** 2: 87-105.

Addresses: [1] C.M.B. 16, Paluma, Queensland, Australia 4816.
[2] 20800 Kittredge Rd, Saratoga, CA 95070, USA

(Ubaigubi Lodge is not currently open to the public. Ed.)

DISPLAY OF THE GLOSSY-MANTLED MANUCODE *MANUCODIA ATRA*

NIKLAS WAHLBERG

At 08:00 on 3 January 1989 I briefly observed a displaying Glossy-mantled Manucode *Manucodia atra* near Tufi, Northern Province. The bird was in the crown of a tall tree, in a clump of forest amidst wet savanna. The characteristic call of the Glossy-mantled Manucode had been heard earlier and was used to locate the bird. The view of the bird in display was partly obscured by foliage but the following was noted. The presumed male threw its wings forward, so that the wings were level with its head, and then produced its long monotonous whistle. A higher pitched whistle was then heard and I realised another bird (presumed to be female) had answered the displaying male. This all happened in about 15 seconds. The performance was repeated and then the birds flew off, with a third previously unnoticed bird.

This display has apparently not been described before (Cooper & Forshaw 1977; Gilliard 1969). Descriptions of the Glossy-mantled Manucode display say the wings are only partially spread and shaken along with the tail. Perhaps this is only part of the display, continuing with what I observed.

Cooper, W.T. & J.M. Forshaw 1977. **The Birds of Paradise and Bowerbirds.** Collins.
Gilliard, E.T. 1969. **The Birds of Paradise and Bowerbirds.** Weidenfeld and Nicolson.

Address: Jaaskentie 7B, 02140 Espoo 14, Finland

VARIATION IN THE DISPLAY OF THE MAGNIFICENT RIFLEBIRD *PTILORIS MAGNIFICUS*

ROY D. MACKAY

The basic courting display and some variations of the display of Magnificent Riflebird have been described several times (Selous 1927; Crandall & Leister 1937; Crandall 1938; Gilliard 1969; Diamond 1972; Coates 1973; Cooper & Forshaw 1977). The known displays of the Magnificent Riflebird are summarised in Cooper & Forshaw (1977), Gilliard (1969) and Coates (1973). The displays described by Selous, Crandall & Leister and Crandall were given by solitary caged males. This is important as the following descriptions show that contact with the female may be a necessary part of the displays.

Over a period of four years, 1978 - 1982, I observed a male Magnificent Riflebird perform the basic display many times in the aviaries of the Baiyer River Sanctuary, Western Highlands Province, PNG. However, on a few occasions I noted additional features of the display apparently not described before.

In the basic display (as I term it) the male perches on a horizontal or sloping branch, spreads his wings to the fullest extent, with the underside of the wing facing forward and with the neck extended upward to show off the brilliantly coloured throat-shield. Then, while the bird raises and lowers himself on his legs and opens and closes his wings a little, to give a rustling sound, he leans his head and neck alternately along the top edge of each wing. This display usually goes on for at least 10 seconds, but sometimes nearly double that time. Sometimes, with the wings spread he will sway his whole body at right angles to the perch, to right and left.

The two variations I noted appear to me to be a pre-basic display and a post-basic display.

In the pre-basic display the male, on his display perch, preened his feathers, fluffed them out and uttered short chirrups and chuckles. Occasionally the wings were flicked half open and closed which usually denoted an imminent full basic display.

On two occasions a female advanced onto the display perch and as the male and female approached each other, without sound, both went into a "trance-like" condition. The female crouched low to the perch, very slowly stretched her head up until her throat and breast were displayed to the male. She stayed in this position for about eight seconds, while the male, in similar "trance-like" movements, stretched his head out to the female and tapped her gently on the breast; four times on the first occasion and three

on the second. After this action the female came out of her trance and flew to a nearby perch. She watched the male who, after some preening and a few more chirrups and chuckles, went into the full basic display.

The post-basic display was noted on two occasions, but not at the same time as the pre-basic displays described above, and also involved the female. First the female sat on the display perch, a little apart from the male, and went into the "trance-like" condition described above. The male immediately went into the full basic display, rising and falling about 10 times. Then, still with wings spread, he turned to the female and clapped her between his spread wings several times. Immediately after this the birds separated and no further activity took place.

Subsequently I have seen them make half-hearted attempts at the pre-basic display, but never as fully as on the occasions described above.

I wish to acknowledge the scrutiny and helpful suggestions given by Clifford D. Frith.

Coates, B. 1973. **PNGBS Newsletter** 87:3.
Cooper, W.T. & J.M. Forshaw, 1977. **The Birds of Paradise and Bowerbirds.** Collins.
Crandall, L.S. 1938. Display of the Magnificent Riflebird. **Bull. N.Y. Zool. Soc.** 41: 43-44.
Crandall, L.S. & C.W. Leister. 1937. Display of the Magnificent Riflebird. **Zoologica - N.Y.** 22: 311-314.
Diamond, J.M. 1972. **Avifauna of the Eastern Highlands of New Guinea.** Nuttall Ornithological Club.
Gilliard, E.T. 1969. **The Birds of Paradise and Bowerbirds.** Weidenfeld and Nicolson.
Selous, E.C. 1927. **Realties of Bird Life.**

Address: C.M.B. 16, Paluma, Queensland, Australia 4816.

AN UNUSUAL NESTING HABIT FOR SWIFTLETS

MICHAEL K. TARBURTON

Throughout their Oriental-Pacific distribution swiftlets have been described as nesting on the rock walls or roofs of cavities and caves. Many such sites are under overhanging rock surfaces, a situation that presumably provides protection from predation by mammals and reptiles. Some species make their nesting sites even safer by only using locations that occur in total darkness (Tarburton 1986). This practice makes brooding swiftlets less vulnerable to attack from visually directed predators such as mammals and birds. Consequently, the major predators, *e.g.* snakes and feral cats, on nesting swiftlets take birds at low or narrow passages between their nests and the cave entrance. Predation at the nest is very limited.

Swiftlets nesting at high altitudes in PNG provide exceptions to these generalities in that they sometimes nest on cave floors. This has been noted in two species, the Mountain Swiftlet *Collacalia hirundinacea*, which is found in the mountains of Irian Jaya (Greenway 1978), mainland PNG (Mayr & Rand 1937; Rand 1942), Japen, Dampier and Goodenough Islands (Mayr 1937), and the White-rumped Swiftlet *Collacalia spodiopygius*, which throughout its wide distribution beyond PNG nests on the overhanging walls or roofs of caves (Tarburton 1986).

Until recently most ornithological expeditions into PNG have concentrated on taking specimens for identification and few swiftlet breeding colonies were located and described. In one exception Rand (1942) noted that the Mountain Swiftlet nested on ledges in subdued light near the bottom of a sink hole. This report did not indicate whether or not the ledges were on overhanging rock.

More recently Australian cavers on speleological expeditions into PNG have noted some swiftlet breeding sites on the floor of the caves. One cave containing White-rumped Swiftlets was at *c.* 1090 m on the Lelet Plateau, central New Ireland (P. Wilson, pers. comm.). The nests were among rocks and flowstone on a rock pile (Figure 1) at the bottom of a ladder pitch, not far from the cave entrance.

The second location involved Mountain Swiftlets and was in the Mamo Kananda Cave (formerly known as Atea Kananda Cave, M.R. 300) which is at 2000 m in the Muller Range, Southern Highlands Province (J.M. James, pers. comm.; Smith 1978). Most nest sites were on the roof in entrances or entrance chambers. Some solitary nests were found on the ground up to half a kilometre from the nearest known entrance.

As the widespread habit of nesting below overhanging rock would seem to prevent or significantly reduce predation for most swiftlet species, why is it that these swiftlets survive while nesting on the floor or on ledges close to the floor? It is difficult to conceive of any reason other than that the predators of swiftlets are uncommon at these high altitudes. Pythons and tree snakes are major predators of swiftlets in caves (Tarburton 1988) and it may be that it is too cold for such reptiles at these high altitudes. Max Mulligan and Clive Butcher, (pers. comm.) who have lived in many parts of the highlands for six years have never seen any pythons or tree snakes above 1000 m. Earthwatch personnel collecting lizards on Mt Kaindi found very few snakes at all between 660 and 3300 m (Gressitt & Nadkarni 1978).

Feral cats are the other known major ground-based predator of nesting swiftlets, but are uncommon and the only other mammalian predators able to prey on ground nesting swiftlets are rats. These are unlikely to have much impact as the introduced species (*Rattus exulans, R. norvegicus & R. rattus*) are the only ones known to eat birds and they are confined to coastal towns and lowlands (Menzies & Dennis 1979). The largest