Egg Deposition by the Bronze-Cuckoos *Chrysococcyx basalis* and *Ch. lucidus*

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Chance (1922, 1940) in his famous work on the European Cuckoo *Cuculus canorus* showed that the Cuckoo normally lays its egg directly into the host nest, while holding an egg of the host in its bill. It then flies away with the host egg, which it later consumes. Chance's observations disproved the then widely-held belief that the cuckoo laid its egg on the ground and carried it, in the bill, to the host nest. More recently, the laying sequence has been filmed for television by the BBC and photographed in colour (Wyllie 1981).

To date, no photographs have been taken of any Australian cuckoo in the act of laying nor, to our knowledge, of any parasitic cuckoo, other than *C. canorus*, elsewhere. Speculation concerning the method of egg deposition by Australian and African cuckoos in dome-shaped nests with small entrances has continued (see Friedmann 1968; Harrison 1969) and the very few eye-witness accounts of laying are inconclusive.

We describe here egg deposition by Horsfield's Bronze-Cuckoo *Chrysococcyx basalis* in three nests of the Splendid Fairy-wren *Malurus splendens* and the Shining Bronze-Cuckoo *Ch. lucidus* in a nest of the Yellow-rumped Thornbill *Acanthiza chrysorrhoa* at Gooseberry Hill, W.A. (31°57'S, 116°03'E).

M. splendens nests are dome-shaped, approximately 125 mm high and 65 mm wide, with a side entrance near the top, measuring about 45 mm in diameter. They are usually situated within a metre of the ground in a small shrub or other vegetation. *M. splendens* lays three eggs, at daily intervals, in the early morning. The species is a co-operative breeder (Rowley 1981) and, in this area, lives in groups of two to eight birds with a territory size of two to nine hectares. At 10 g, *M. splendens* is approximately half the size of a Bronze-Cuckoo (23 g).

Nest 8558

Laying by *Ch. basalis* was first observed on 23 November 1985. Nest 8558 had been previously located on 20 November and on 22 November it contained one Wren egg. We began a nest watch on 23 November at 0600 h (about an hour after sunrise), when the nest contained two Wren eggs, i.e. the Wren had already laid that morning. We watched the nest from a distance of about 30 m using binoculars and a 25 x magnification telescope, without a hide. We were positioned directly in front of the nest entrance. From 0620 h onwards, one or more *Ch. basalis* began to call. No attempt to locate the Cuckoo(s) was made as we were concentrating our attentions on the nest. At 0811 h we saw a Cuckoo land in a small bush 1-2 m from the nest. It spread its tail and opened its wings, looking up at a smaller bird (probably a Wren but not identified) that was fluttering above it. We then changed from binoculars to the telescope, which was focused on the nest entrance, and saw a Cuckoo enter the nest. The lower back, wingtips and tail remained visible. The Cuckoo stayed in this position for an estimated two to three seconds. It then moved backwards out of the nest, carrying an egg in its bill, and flew off. No more than five seconds later a more brightly coloured Cuckoo alighted briefly on the top of the nest dome before also flying off. The nest was inspected immediately and was found to contain one Wren egg and one egg of *Ch. basalis*. There appeared to be no damage to the nest and the Wren laid a third egg the following day.

Nest 8560

Laying was observed on a second occasion on 1 December 1985. Nest 8560 had been found on 22 November and the first Wren egg was laid on 30 November. We began a nest watch at 0600 h on 1 December, using binoculars and telescope as previously, but this time from about 20 m and at right-angles to nest entrance. As before, the nest contained two Wren eggs at the start of the watch. From 0710 h a Cuckoo began to call intermittently from some distance away and at 0840 h, repeatedly from the north-west. At 0900 h a Cuckoo flew from the south-east straight to the nest, alighting at the nest entrance with its wings spread wide. When viewed through the telescope, only the tail could be seen, angled vertically down from the nest entrance. As before, the Cuckoo emerged backwards from the nest, turning its head to the left as it did so. It was holding an egg in its bill. The Cuckoo then flew off. It was at the nest for not more than four or five seconds. We neither saw nor heard any agitation from the Wrens. After the Cuckoo had left, we saw a male Wren in bushes behind the nest. The Wren seemed unaware of what had taken place. On inspection the nest contained one Wren egg and one Cuckoo egg and the third Wren egg was laid the following morning.

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Nest 8637

On 21 October 1986 a third laying was observed and, on this occasion, video-taped. The nest had been located on 13 October and the first Wren egg was laid on 19 October. A hide was erected that afternoon, directly in front of and about 3 m from the nest entrance and was camouflaged with branches. We watched the nest for about three hours on the morning of 20 October and a video-tape was made of the Wren laying her second egg but no Cuckoos were seen or heard. On 21 October we began a nest watch at about 0700 h. The nest contained two Wren eggs at the start of the watch and the Wren was video-taped laying her third egg at 0810 h. At 0830 h the Wren left the nest and less than 5 min later a Cuckoo landed with a thud immediately in front of the hide but out of sight. At 0835 h the Cuckoo laid, in the same manner as before, and was video-taped as she entered the nest. We timed the period spent in the nest from the video replay at 1.5 sec. Allowing for perhaps two to three seconds before the video-recorder was switched on, it can have taken only five seconds at most for the Cuckoo to complete the procedure. On inspection the nest contained two Wren eggs and one Cuckoo egg.

Nest 8658

On a fourth occasion a Cuckoo was observed removing a host egg without laying. Nest 8658 was first found on 14 November. On 18 November 1986 it contained one Wren egg and a hide was erected as before, but at an angle of about 100° from the nest entrance. We watched the nest from 0730 h on 19 November, at which time the nest contained two Wren eggs. At 0755 h a Cuckoo landed in front of the hide, flew around behind the nest and was video-taped as it entered the nest from the far side and removed an egg. On inspection the nest contained only one Wren egg. We made a close examination of the ground beneath the nest but could find no Cuckoo egg. We continued to watch until 0900 h without event. At 1235 h the nest still contained one Wren egg and at 0700 h the following morning, one *Ch. basalis* egg alone! At 1100 h it contained the Cuckoo egg and one Wren egg, i.e. the Wren's third egg, the first two having been removed. Timed on the video replay, the Cuckoo spent 5.3 sec at the nest.

Like those of *M. splendens*, the nests of *A. chrysorrhoa* are dome-shaped, but with a hooded side entrance measuring about 30 mm in diameter. Nests are usually placed in the hanging foliage of a tree or shrub. *A. chrysorrhoa* lays three or four eggs at 48 h intervals, in the early morning. The species is similar in size to *M. splendens*.

Nest 87Y47

Ch. lucidus was observed laying in a nest of *A. chrysorrhoa* on 16 October 1987. Nest 87Y47 had been previously found on 12 October when it contained two eggs. A hide was erected that evening, 3 m from the nest and at an angle of about 45° from the nest entrance. We watched the nest on the mornings of 13 and 14 October and, although the Thornbill laid her third egg during the first watch, no Cuckoo was seen. On 15 October heavy rain made nest watching impossible and during the day the hide was blown down. When we reset the hide at 1630 h that evening the nest contained only two Thornbill eggs! There were still two host eggs at 0550 h the following morning. At 0650 h a Cuckoo landed, without warning, on a small branch at the side of the nest and was video-taped as it entered the nest, leaving only the tail in view beneath the entrance hood. After about ten seconds the Cuckoo moved slightly further into the nest and then, with some difficulty, emerged backwards and flew off with an egg in its bill. On inspection the nest contained one Thornbill egg and one egg of *Ch. lucidus*. We carefully examined the nest entrance but could detect no damage. Timed on the video replay, the Cuckoo spent 18 sec at the nest.

Conclusions

Our observations have shown that:

(1) *Ch. basalis* and *Ch. lucidus* lay in the same manner as *C. canorus* i.e. directly into the host nest. At no time did we see an egg in the bill of a cuckoo *entering* a nest. After laying, the cuckoo emerges backwards from the nest, again in much the same manner that *C. canorus* leaves the confined nests of the Meadow Pipit *Anthus pratensis* (Plates 20 and 24, Chance 1940).

(2) Both Cuckoos remove one host egg when laying.

(3) Both Cuckoos lay in the early morning, compared to the afternoon for *C. canorus* (Chance 1922, 1940; Wyllie 1975).

(4) Egg-laying takes less than 20 sec compared to 8 sec for *C. canorus* in the open-cup nests of the Great Reed Warbler *Acrocephalus arundinaceus* (Molnar, in Wyllie 1981), 11 sec in the nest of the Reed Warbler *Acrocephalus scirpaceus* (Wyllie 1975) and from 4-16 sec in Chance's nests of the Meadow Pipit (Seel 1973).

It is not surprising that *Ch. basalis* can lay directly into the nests of *M. splendens* because the nest entrance is relatively large compared to the girth of the Cuckoo. *Ch. lucidus*, on the other hand, probably has little room to manoeuvre when entering a nest of *A. chrysorrhoa*. Ramsay (1865) writes that parasitised thornbill nests observed by him had entrances 'nearly twice as wide' as usual, although he may have been referring to nests parasitised by the much larger Fan-tailed Cuckoo *Cuculus pyrrhophanus*. Marchant (1986) found that the entrance to a nest of the Buff-rumped Thornbill *Acanthiza reguloides* parasitised

by *Ch. lucidus* had been greatly enlarged but Gill (1983) found no damage to parasitised nests of the Grey Warbler *Gerygone igata* in New Zealand.

We conclude that neither Cuckoo has trouble entering dome-shaped nests composed of flexible materials such as dry grass and cobwebs. On the four occasions on which laying was observed, the Cuckoo appeared to be standing on the nest entrance, not within the nest. This means that as long as a Cuckoo can squeeze her shoulders into the entrance she can, apparently, lay in the nest.

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Responses of Pterodroma Petrels to Man-made Sounds

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It has long been known that gadfly- and other petrels may be stimulated to call in response to a footfall, a shout, or an imitation of their calls, e.g. the Providence Petrel *Pterodroma solandri* (Hull 1910, 1911; McCullough 1921), the Flesh-footed Shearwater *Puffinus carneipes* and Mottled Petrel *Pterodroma inexpectata* (Warham 1958; Warham *et al.* 1977). Some can also be lured from the wing by man-made sounds. The Cahow *Pterodroma cahow* seems to be the first gadfly-petrel to have been shown to be susceptible to such vocal lures. In 1603, a Spanish galleon under Diego Ramirez was storm-driven into a harbour on Bermuda and the hungry sailors found that the Cahows could be called from the wing to the ground. They could take 4000 'in a single bag' (Beebe 1935 p.187). In 1609, a British ship, the *Sea Venturer*, was wrecked on that island and William Strachey, writing in 1610, reported that 'Our men found a prettie way to take them which was by hollowing and laughing, with the noyse thereof, the birds would come flocking to that place, and settle upon the very arms and head of him that so cryed, and still creepe neerer and neerer, answering the noise themselves...' (Beebe 1935 p.187). Verrill (1902) also described the similar methods used for capturing the Cahows by the early settlers on Bermuda.

According to Perkins (1913) another gadfly-petrel taken by calling to flying birds was the Hawaiian Petrel or Uau *Pterodroma phaeophygia*, a traditional food of the Polynesians of those islands.

In Australia the Providence Petrel is the only tubenose known to be lured to the ground by man-made calls and Hindwood (1940) reported that if the calls persist the grounded birds come right up to the caller and will even crawl onto his body.

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