

## Observations of a Captive Black-Breasted Buzzard *Hamirostra melanosternon* Using Stones to Break Open Eggs

by DAVID L. PEPPER-EDWARDS and ELIZABETH NOTLEY,  
Taronga Zoological Park, P.O. Box 20, Mosman, N.S.W. 2088

### Summary

Egg-breaking behaviour was studied in a captive Black-breasted Buzzard *Hamirostra melanosternon* of unknown history. The bird concerned used two methods to break open eggs in order to feed on the contents. Eggs of domestic fowl *Gallus gallus* were thrown against a hard substrate. Emu *Dromaius novaehollandiae* eggs were broken using stones thrown from a standing position on the ground. In both circumstances, the throwing action was the same: the bird raised the object (egg or stone) in its bill and threw it sharply downwards, in the same manner as the Egyptian Vulture *Neophron percnopterus*. The Buzzard immediately recognised large eggs as food, and its egg-breaking behaviour improved with practice.

### Introduction

The Black-breasted Buzzard *Hamirostra melanosternon* is a nest-robber (Cupper & Cupper 1981, Hollands 1984). It has been reported to use stones to break open the eggs of the Emu *Dromaius novaehollandiae*, Brolga *Grus rubicundus* and Australian Bustard *Ardeotis australis* in order to feed on the contents (Gould 1865, Berney 1905, North 1912, Campbell & Barnard 1917, Moriarty 1972, Serventy & Whittell 1976). Although many observers have cast doubt on these reports, they have been rendered more credible by the behaviour of the Egyptian Vulture *Neophron percnopterus*, which breaks Ostrich *Struthio camelus* eggs by hurling stones at them (Thouless et al. 1989).

During trials with a captive Black-breasted Buzzard at Perth Zoo, Western Australia, the bird broke into Emu eggs by using its bill (Davies in Boswall 1983, Blakers et al. 1984). Following this, it was considered that the Buzzard does not use stone 'tools' to break eggs (Boswall 1985). However, Aumann (1990) established, using a captive immature bird of unknown history, that the Black-breasted Buzzard does have the capacity to break large eggs by throwing stones at them from its bill, in the style of the Egyptian Vulture. This therefore confirmed the observations made by the Aborigines and early ornithologists.

In 1984 Taronga Zoo received a first-year Black-breasted Buzzard. To investigate whether the bird was capable of the stone-throwing behaviour, several trials were carried out.

### Methods

When the Buzzard was obtained, its plumage was that of a late first-year bird (Pepper-Edwards & Notley 1991). It was found on the roadside near Wollongong, New South Wales. Its history was unknown but its behaviour and unsuitability for release suggested that it was an escaped falconer's bird, possibly taken as a nestling and hand-reared. It was kept in solitary confinement at Taronga for almost four years, during which it had no exposure to eggs or stones. It was in its fifth year when the egg trials started.

### Trial 1

Initially, the Buzzard was housed by itself in a small enclosure with a sand floor. In March 1988 feeding experiments consisted of domestic fowl *Gallus gallus* eggs being placed on the floor of the enclosure, to investigate the bird's interest in them as a food item. Stones were not provided at this time.

### Trial 2

In June 1988, several stones the size of domestic fowl eggs (measurements not recorded) were introduced into the enclosure for two days. After this period, Emu eggs were introduced for several days. Eggs and stones were placed on the floor. The bird's feeding behaviour was recorded on videotape.

### Trial 3

In May 1989 the bird was moved to a larger mixed-species exhibit with a concrete floor. Also housed in this exhibit were two Whistling Kites *Haliastur sphenurus*, one Black Kite *Milvus migrans* and one Spotted Harrier *Circus assimilis*.

In May 1990 the feeding trials were repeated with stones ranging in mass from 35 g to 147 g. The bird's behaviour was again recorded on videotape.

## Results

### Trial 1

At normal feeding times and before the provision of eggs, the Buzzard habitually flew to the end of the enclosure and approached the food by strutting up to it. In the initial feeding experiments with the fowl eggs, the Buzzard approached the egg in this manner and picked up the egg in its beak. It then raised the egg, and with a fast downward movement released it onto the enclosure floor. This behaviour was repeated twice without breaking open the egg. The bird then carried the egg in its bill as it walked over to its concrete water-trough. With the same fast downward movement, it smashed open the egg on the corner of the trough then fed on the contents. This became the normal behaviour when eggs were fed weekly.

### Trial 2

When an Emu egg was first placed in the enclosure in May 1988, the bird was reluctant to feed while being observed by the keeper. Later examination indicated that the egg had been broken open and the contents removed. The bird was again offered an Emu egg, this time after food was withheld for a day. It immediately flew down to the end of the enclosure as for normal feeding and strutted up to the egg. After a brief examination, the bird searched for a stone. After picking one up in its bill it immediately walked to the egg, raising its head vertically as with the fowl egg, and with a sudden downward movement released the stone. This was repeated several times until the egg broke, upon which the bird ate the contents.

### Trial 3

In 1990 the Buzzard repeated similar behaviour to that described above in trial 2, but this time used several different stones, favouring a jagged one weighing 99 g. The bird cracked the egg on the first blow, removed shell fragments with its bill and ate some of the contents through a hole in the shell. It continued to throw stones (primarily the 99 g one) at the egg a further twelve times, pausing between blows to peck at the shell. Meanwhile the egg contents had leaked out and run down a slope, making it impossible for the bird to eat. Successive strikes gradually demolished the now empty shell, leaving it flattened and in pieces. After the final blow the Buzzard threw a stone on another stone once, walked several metres with a stone in its bill, discarded it then abandoned the feeding behaviour after about 15 minutes in total. During this trial, the bird used an 'aiming' procedure as described by Aumann (1990): on four occasions it lowered the stone and held it momentarily just above the egg before raising its bill; on a further five or six strikes at least, it paused momentarily with the stone several centimetres above the egg before raising its bill. By the final trial the bird had become proficient at breaking Emu eggs by using stones, requiring only one blow to open the egg.

## Discussion

The results of this study corroborate Aumann's (1990) results. They show that individual Black-breasted Buzzards have the capacity to break large eggs by stoning them. There is now proof, from different sources, that the Black-breasted Buzzard employs a form of tool use when feeding on large, hard-shelled eggs (cf. Boswall 1983, 1985).

Our observations on the Buzzard at Taronga Zoo generally concur with those of Aumann (1990) and Thouless et al. (1989) on egg-breaking behaviour in the Black-breasted Buzzard and Egyptian Vulture, respectively. The Taronga bird immediately recognised medium-sized and large eggs as food, but it is not known whether it had prior experience of eggs. When presented with eggs on the ground, the Taronga bird threw medium-sized (fowl) eggs against a hard substrate but threw stones at large (Emu) eggs. Stone-throwing in the Buzzard therefore seems related to egg-throwing, as in the Vulture. There was some slight individual variation in the technique used by the two captive Buzzards: the bird studied by Aumann used a twisting motion to one side, whereas the Taronga bird raised and threw the stones vertically.

While stoning an Emu egg, the Buzzard at Taronga Zoo deliberately threw a stone onto another stone, as did the bird studied by Aumann (1990). This suggests that the throwing behaviour is a 'fixed action pattern', triggered by the sight of a large egg: if small enough, the egg itself is thrown; if not, an egg-like object is thrown at the egg. This suggests that the behaviour is innate rather than learned, but it is not known whether the Taronga bird had the opportunity to learn the behaviour from another Buzzard. Whatever the origin of the behaviour in the Taronga bird, it improved with practice: both in selecting an appropriately hard substrate for cracking fowl eggs, and in proficiency at opening Emu eggs. This suggests some capacity in the Buzzard to refine the technique through experience, as also demonstrated by the bird observed by Aumann.

The Taronga bird fetched stones, as did the individual studied by Aumann (1990), which suggests some capacity in the Black-breasted Buzzard to search for and transport suitable missiles if none is found *in situ* at a ground nest containing large eggs. This provides support for early statements that the Buzzard does just that, and explains the finding of foreign objects among broken Emu eggs when no such objects occurred naturally in the immediate vicinity (e.g. Bennett in North 1912; Campbell & Barnard 1917).

It is not clear why some Black-breasted Buzzards use stones to break Emu eggs and why some simply use their bills. Perhaps this is determined by a naive bird's first experience of large eggs — if suitable missiles are present *in situ*, then the throwing behaviour may be triggered; if not, the bird may use its bill alone. Further experiments and field study on the subject are required.

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