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KEA, BIRD OF PARADOX: THE EVOLUTION AND BEHAVIOUR OF A NEW ZEALAND PARROT

by **Judy Diamond and Alan Bond**

1999. *University of California Press, Berkeley and Los Angeles, California*. Pp. 230 + xiii, colour plates 1, black and white illustrations 27, maps 3, 215 x 145 mm, hardcover. Available from NHBS (orders@nhbs.co.uk) price 19.95 pounds plus postage.

The Kea *Nestor notabilis* is a cockatoo-sized parrot endemic to the South Island of New Zealand, where it mostly lives in the mountains at around the tree line. It is a New Zealand icon, infamous for its cheeky inquisitiveness and destructiveness, as well as its habit of attacking and killing sheep. It both plagues and delights all users of the South Island mountainous back-country. Since its discovery it has attracted a good deal of attention in both the scientific and popular literature, but this book is probably the first directed at an audience outside New Zealand. It was published in the US and seems aimed at a US audience. This small (A5 format) solid feeling hard-backed book is well presented in a style reminiscent of natural history books published earlier this century. It is printed on yellowish paper and apart from a colour frontispiece it includes only black and white photos and drawings. The colour jacket includes a 1925 water-colour that is both attractive and interesting.

The contents of the book are a bit paradoxical. It is written in a very readable anecdotal style, but the assertions and observations are backed up with extensive references, notations and data which make up about a third of the book's length. The book falls in a strange middle ground between strictly scientific writing, and popular natural history.

The first two chapters set the scene. Chapter One describes the development of New Zealand's bird fauna and the evolution of Kea. It details why and how the authors think Kea became opportunistic omnivores. Chapter two describes the changes to New Zealand's flora and fauna following the arrival of humans, how these changes affected Kea, and how Kea developed their flesh-eating habit.

Chapters three, four and five deal with the main focus of the book: Kea behaviour. Chapter three describes the authors' study sites and methods, then describes the foraging and social behaviour of Kea that they observed. Kea's play behaviour is described at some length. Chapter four describes the behavioural development of young Kea. Young Kea cannot distinguish between edible and inedible items and it is through watching other Kea and through play that they learn what and how to eat. The authors maintain that Kea's learn more than most other birds. Chapter five describes the authors' work on the Kea's closest relatives the Kaka *Nestor meridionalis* and compares the behaviour of the two species. Kaka are less aggressive than Kea, they

play less, and their juveniles do not have the preferential status of juvenile Kea. The authors explain these differences by hypothesising that unlike Kaka which live in a rich forest environment, Kea live in a harsh alpine environment that reduces their survivorship and prospects of breeding. This leads to fierce competitiveness, a rigid social hierarchy and delayed maturation. They explain how the winter survival of juvenile Kea would be very low without some lenience from adult Kea and they suppose that the combination of delayed maturity and parental lenience has provided an evolutionary opportunity to develop play and learning behaviour (a childhood). Furthermore they explain that in the Kea's harsh and unpredictable environment, the ability to learn quickly and shift to new food resources was a great advantage.

Chapter six winds things up. It describes the problems faced by Kea in New Zealand today, how they once attracted a bounty for their sheep killing behaviour, but how they are now protected. It documents a recent Kea smuggling incident and it estimates the total Kea population.

Some of Bond and Diamond's descriptions of Kea behaviour are a bit at variance with my observations. They say that Kea fledglings are not independent of their parents until 18 months old, yet in my experience they stop being fed by their parents after a couple of months. They present evidence that Kea mostly do not breed every year, whereas near Nelson Lakes National Park most adult Kea breed most years. They also suggest that nest sites might be limiting, whereas at Nelson Lakes each pair of Kea seems to have three or four suitable nest sites that they choose between each year. It seems possible that Kea numbers near Arthur's Pass where Bond and Diamond did their work were maintained at a high level by the extra food Kea could find year round at the rubbish dump, and this high density has led to the long dependence and shortage of nest sites.

These differences could alter Bond and Diamond's model of the evolution of Kea learning behaviour. They said that delayed maturity and parental lenience ('childhood') were a by-product of the prolonged dependence and infrequent breeding caused by the harsh environment and limited nest sites. They also said that childhood provided the unique evolutionary opportunity to develop learning behaviour. However, prolonged dependence, infrequent breeding, and limited nest sites are not universal amongst Kea, and it seems equally plausible that delayed maturity and parental lenience were a by-product of the development of learning behaviour.

Bond and Diamond's description of their method of estimating Kea numbers takes up only a small part of the book, but it is the first documented and systematic attempt to estimate the total Kea population and is worthy of some discussion. Although Kea are on the edge of being endangered, some birds are still killed each year because of their sheep-killing habits. There is considerable controversy about

whether the continued Kea kill is justifiable and sustainable, and the size of the Kea population has great bearing on this controversy. For this reason estimates of Kea numbers need to be reliable. There is a serious flaw in Bond and Diamond's method of estimation. Their method assumed that Kea occurred throughout the South Island and that their failure to be detected in some grid squares during the Ornithological Society of New Zealand's bird distribution project was a chance event. In fact, large parts of the South Island are unsuitable for Kea and their failure to be detected in grid squares in these parts of the island is not a chance event – they never occur there. To estimate an average Kea density and multiply it up by the area of the whole of the South Island is a silly exercise. Bond and Diamond might get closer to the truth if they excluded those parts of the South Island that are obviously unsuitable for Kea, but even that would ignore the fact that variation in the number of Kea sighted is not just sampling error, it also reflects different population densities in different parts of the Kea's range. Without a detailed examination of the data that Bond and Diamond used it is not possible to say whether their method would over or underestimate the Kea population.

This book presents a few minor problems for a New Zealand reader. The cheek of Americans writing about one of New Zealand's icons is not worth further discussion, but the Americanisms throughout the text indicate that the book was intended for a US audience not an NZ or Australian one. In NZ we don't pluralise Maori words with an 's', we say 'in the South Island', not on it, and we have farmers or runholders, never ranchers.

Despite these criticisms the book is a good read. It comprehensively brings together the historical and prehistoric information on Kea, and Bond and Diamond's descriptions of Kea behaviour and their theory about the evolution of the Kea's learning behaviour, are well worth reading.

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