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Experimentally Induced Infanticide: The Removal of Birds and Its Ramifications

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There currently is great interest in the ethical issues surrounding research on nonhuman animals (hereafter animals), including field studies of behavior and behavioral ecology (American Society of Mammalogists 1987, Oring et al. 1988, Michener 1989, Animal Behavior Society 1991, Bekoff and Jamieson 1991, Cuthill 1991, Bekoff et al. 1992). Thus, a study (Emlen et al. 1989) of experimentally induced infanticide in Wattled Jacanas (*Jacana jacana*) deserves scrutiny, for there are some matters of concern centering on: (i) the review process for publication; (ii) the methods used to remove two adult female jacanas; (iii) the maiming and killing of seven of their infants by replacement females as a direct result of the deliberate removal of the mothers of the young birds (for further discussion of some ethical implications of infanticide studies, see Elwood 1991; for recent review of studies of cognition, pain, and stress in birds, see Elzanowski and Abs 1991, Gentle 1992); and (iv) questions concerning trade-offs between the importance of acquiring different types of knowledge and the types of animal research that are permissible in the pursuit of this knowledge. The AOU guidelines (Oring et al. 1988) also do not specifically outline procedures for studying infanticide, and do not directly address in

detail many of the ethical problems involved when performing manipulations that include the removal of animals from, or the addition of animals to, already existing groups (the former of which is a common manipulation in studies of territoriality and parental care; Cuthill 1991). However, the guidelines do address some of the adverse effects of field research that can stem from trapping, banding, and visiting nests (see also Henson and Grant 1991, Wilson et al. 1991), all of which may be used in studies involving social manipulation of animal groups.

The paper by Emlen et al. (1989) was submitted to the *Auk* and reviewed after the AOU guidelines (Oring et al. 1988) on the use of wild birds in research were published. Why was this study published in a journal sponsored by a society that had already established guidelines concerning the ethics of various types of research, some of which appear to be violated? Thus, while it is probably true that the two adult females collected by shooting (a fact not included in the original paper) were "humanely collected" in accordance with the AOU guidelines that "Humane use of firearms necessitates that birds be killed outright" (Oring et al. 1988:10a), it is not clear why alternative methods of removing and replacing

the adult females were not used. Furthermore, the experimental design that allowed subsequent and continuous harm to come to seven chicks as a direct result of the killing of their mothers appears to violate at least two AOU guidelines (Oring et al. 1988:4a), namely, the requirements that: (a) Procedures with animals must avoid or minimize distress and pain to the animals, consistent with sound research design. (b) Procedures that may cause more than momentary or slight pain or distress to the animals should be performed with appropriate sedation or analgesia, except when justified for scientific reasons in writing by the investigator in advance.

Terminology is also important to consider, for there are some potential problems concerning the word "collected." While it may be that use of the word "collected" is a nonissue for some ornithologists in that it is an obvious synonym for "killed" (Oring et al. 1988:10a-11a), I and one reviewer, for example, did not know that collected stipulatively meant killed. Furthermore, professional journals are not only read by professionals in the field. Thus, all readers, reviewers, and editors are entitled to know exactly what methods were used for collection, for different forms of collection will expose animals to varying degrees of suffering (Oring et al. 1988:10a-11a). Researchers often use a variety of words either intentionally or unintentionally to refer to the act of killing other animals (e.g. sacrificing, euthanizing, culling). These terms may serve both to distance or to detach researchers from what they have done to the animals they study and to objectify methods and the animals they have chosen to use (Lynch 1988, Lacy 1991, Verhoog 1991). By talking or writing about the details of the types of manipulations that have been performed in their studies, researchers may become more sensitive to what they have actually done. This realization may force them to seek alternative and more humane methods of study.

One also needs to ask questions about the ethics of performing experimental studies to test hypotheses that predict possible killing or maiming as a result of the manipulations of animal groups (Huntingford 1984). Emlen et al. (1989:5) indicated that there were numerous intensive attacks on some chicks and that seven of nine chicks had been "eliminated" after their mothers had been removed. Indeed, some chicks were brutalized by replacement females to the point that they limped about or were unable to maintain their balance while walking, prior to their disappearance. The investigators presumed (with reason) that injured chicks who could not be followed died from their injuries.

Were the lives of the killed females and chicks worth a study of experimentally induced infanticide? Of course, questions concerning the importance of acquiring different types of knowledge are extremely difficult to answer (Midgley, 1989). Also, discussions concerning trade-offs between animal pain and suf-

fering and the acquisition of knowledge do not submit to simple answers (Driscoll and Bateson 1988, Bekoff 1991, Bekoff and Jamieson 1991, Bekoff et al. 1992), especially when humans have played a significant role in bringing about the pain and suffering. With respect to the study by Emlen et al. (1989), because Wattled Jacanas are polyandrous and sex roles are reversed, the data may be interesting from a comparative and evolutionary perspective, especially because they are consistent with data from reports on naturally occurring infanticide in nonpolyandrous mammals. Yet, one can still question from an ethical perspective the experimental methods employed by Emlen et al. (1989) that involved deliberately killing adult females, the result of which included attacks on chicks by replacement females, aggression that was allowed to continue until chicks were also killed. Why was it impossible to remove and then either replace or relocate the adult females? Why were the chicks given no opportunity to escape from the attacks that were directed at them (e.g. Huntingford 1984)? Why did the researchers choose not to interfere with ongoing aggression directed toward the chicks, attacks for which the researchers were responsible, or otherwise protect the chicks from harm (e.g. Perrigo et al. 1989)? It is inarguable that future studies of infanticide and other interesting social and nonsocial phenomena must give serious concern to all individuals who are being studied (Bekoff 1992), including those who are affected directly and indirectly by the experimental methods that are used.

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Ethics and Experimentation: Hard Choices for the Field Ornithologist

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Every scientist must make difficult ethical decisions when designing experiments, whether such experiments are conducted in the laboratory or in the field. Typically, these decisions require weighing the likely scientific gain (in terms of new information to be learned) against the animal cost (in terms of suffering of the individuals involved). The question of when the pursuit of knowledge justifies the imposition of suffering on animal subjects is one that should be honestly confronted and constantly reassessed. Most scientific societies have published guidelines to help individual scientists formulate their answers (e.g. Oring et al. 1988, Dawkins and Gosling 1992, Anonymous 1987, 1992). However, even with such guidelines, there is no magic "threshold" of agreement. Rather, there is a broad grey area within which different opinions are vehemently expressed. Peer feedback is useful in defining these grey areas and in stimulating discussion about them. It is in this light

that I welcome the opportunity to reply to the commentary of Bekoff (1993).

Bekoff (1993) criticized our study (Emlen et al. 1989) of experimentally induced infanticide in jacanas on ethical grounds and chastised the American Ornithologists' Union for publishing our article in the *Auk*. As the senior author of the challenged paper, I wish to justify our specific experiments, as well as address the broader issue of ethical trade-offs in experimental science.

If asked, everyone would agree that unnecessary and unnatural pain and suffering in animals should be minimized wherever possible, but there exists a spectrum of opinions on when and whether intervention and experimentation are appropriate. At one end, few would disagree that many birds are kept in captivity under sufficiently inhumane conditions that no degree of scientific justification can excuse their poor care. At the other, field ornithologists routinely