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## WHO WATCHES THE WATCHMEN?

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*The Inevitable Bond* is a thoughtful look at how students of animal behaviour relate to their subjects. Cohesive and rich, it is a fine example of what a multi-authored book should be. Davis and Balfour provide introductory notes to each chapter, and have obviously taken great care in placing similarly themed chapters together. One paper's ideas are picked up and reiterated in others, becoming powerful motifs.

One of *The Inevitable Bond's* strongest themes is the use of anecdotes as a source of scientific information (see also Bekoff, 1993). Fentress (Chapter 4) puts the case for anecdotes forcefully and convincingly. He shows that deep insights into an animal's behaviour can be gained by watching "one-off" incidents, although he cautions that such observations must be supported by more controlled and rigorous testing (also Duncan, Chapter 18). Echoes of Fentress's argument are found throughout the book. Virtually every chapter contains vivid anecdotes; anyone teaching animal behaviour should find stories worth telling their students. Even Summerlee's chapter on the neurophysiology of arousal ends with an informal observation of how he could hear a rabbit's physiological response (by hooking a speaker into the equipment) and tell if it had been disturbed.

Even though casual observations are often striking and can be a gold mine for new ideas, there is practically no place to publish anecdotal information. Natural history has seen better times, and the excitement of ethology often seems lost amid charts and tables (Kortlandt, 1990). By neglecting anecdotal information, we do ourselves a disservice in several ways. First, we can end up avoiding the things that first attracted us to animal behaviour (Crowell-Davis, Chapter 20). Secondly,

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we lose knowledge about behaviour that can serve as a platform for other types of research (Bullock, 1993). Worst of all, because so many of these informal observations inspire and guide researchers, ignoring anecdotes can fundamentally distort our understanding of the scientific process. For example, several authors say their data collection was *dependent* on their experience, or a particular working relationship with their animals. After working with snakes for years, Burghardt can elicit attack behaviours that other researchers can't (Bowers and Burghardt, Chapter 16). Boysen (Chapter 12) says that a stable social environment for her chimps is "crucial" for gathering data. Furthermore, chimps not only form relationships with their researchers, but may form particular kinds of relationships, differentiating between "playmates" and "mentors." Indeed, some people seem to be more popular with the chimps than others, but this was not investigated systematically (Oden and Thompson, Chapter 13). Finally, there is Burghardt's moving account of how only one (out of four) of his graduate students developed a relationship with two bear cubs that permitted him alone to run certain behavioural tests (Chapter 23).

Such stories clear the path to a fundamental epistemological problem: what constitutes good evidence? Good scientific evidence is supposedly repeatable by anyone. If, however, only a rare individual is able to gather certain sets of data, what should we make of the evidence then? Even worse, what if we aren't told the data were dependent on an unusual relationship between experimenter and animal, because the information was omitted as "too anecdotal"?

A second key theme in *The Inevitable Bond* is that animals can be incredibly sophisticated processors of information. As a simple example, many animals can recognize individual humans. This is amply documented in many chapters dealing with mammals (Dewsbury, Chapter 3; Fentress, Chapter 4; Boysen, Chapter 12; Crowell-Davis, Chapter 20; Schusterman et al., Chapter 21; Burghardt, Chapter 23). More unexpectedly, reptiles (Bowers and Burghardt, Chapter 16) and octopuses (Mather, Chapter 15) can also recognize people and remember them for weeks or more.

Besides recognizing us, animals can recognize what we are doing. Consider the well known story of Clever Hans. The lesson normally taken is that experimenters should beware inadvertently cueing their subjects. This seems to be why Davis and Balfour (Chapter 1) declare the Clever Hans effect outside the book's scope, but Crowell-Davis (Chapter 20) argues that a subtler point is often missed: animals can be very good at figuring out another species' behaviour. Clever Hans attended and reacted to human gestures that other people weren't even

aware of. Even when people realized they were cueing Clever Hans, they could not control those signals. The systematic study of interspecific signalling has been neglected, despite its impact on research. For example, when Pepperberg is working with her parrot, Alex, she and her colleagues must act like the task is interesting to them, or Alex is likely not to "pay attention" and start preening (Chapter 11). Dogs make excellent companions because humans unknowingly act like the dominant member of a pack (Ginsburg and Hiestand, Chapter 6). Worse, we often have little idea *what* animals might attend to. A standing human wearing gloves induces more fearful responses in pigs than a crouching, bare-handed one, for instance (Hemsworth et al., Chapter 17). Chickens are less stressed being caught by a machine than by a person (Duncan, Chapter 18).

Conversely, we seem to decipher animal signals erratically. There are strong examples of misinterpretation. Dolphins' gaping ("smiling") is actually a dominance challenge (Estep and Hetts, Chapter 2). Head nodding by some seals is an aggressive signal that some trainers unwittingly rewarded, hoping to use it in performance (Schusterman et al., Chapter 21). Nevertheless, Schusterman et al. make the counterpoint that sometimes the only way one can work with a species is to understand its social cues. The taller of two rearing male elephant seals becomes dominant; consequently, scientists can work fairly safely among them — even though the animals weigh over 20 times what a human does — because we stand higher than seals can rear (Chapter 21). Similarly, Burghardt's students had to fight off dominance challenges by their bears (Chapter 23).

Such interspecific signalling between scientist and animal is a prime example of how experimenter effects can form a continuum (Davis, 1993). As our closest phylogenetic relatives, chimps share much of our behavioural repertoire and so recognize many of our cues (Boysen, Chapter 12). On the other hand, although octopuses can recognize individual humans (Mather, Chapter 15), their ability to decipher human signals is probably limited. Likewise, we have an impoverished ability to appreciate the "mindset" of octopuses, which seem like something from science fiction. This may be why octopuses' behaviour frequently seems directly aimed at frustrating their keeper (personal observations).

Given the subtlety of experimenter effects, one may think that the most rational plan is to not interact with animal subjects. A few chapters expound this conventional wisdom and detail how bonds can be minimized. Baum and Hiestand (Chapter 14) talk about the sort of automated testing boxes championed by B. F. Skinner. Boccia et al. (Chapter 9), however, note that handling effects are hard to eliminate

when animals are kept for years and used in many experiments. Obviously, in many cases, reducing the number and intensity of interactions with animal subjects is totally appropriate, as it will alleviate both handling effects and stress on both the subjects and scientist (Duncan, Chapter 18). Paradoxically, one way to do this is by cultivating a relationship with the animals. Reinhardt details how, by developing a bond with their monkeys, they no longer had to fight to take blood samples (Chapter 10). Such an approach — working closely with animals with the express idea of forming relationships with them — is far better represented in *The Inevitable Bond* than the usual practice of shirking contact. Although the book doesn't convince me that it is impossible to avoid bonding, it does show how much research is *dependent* on animal-human bonds, as I noted above. Some scientists intentionally decide to work closely — almost intimately — with their animals, thereby exploiting a bond. Pepperberg (Chapter 11) has based her research program (effectively a decade-long and ongoing case study) on her interactions with one subject, her parrot Alex. This situation seems to be the norm in primate studies, represented here by Boysen (Chapter 12) and Oden and Thompson (Chapter 13). Not all experimenters can manage this amount of commitment to their animals (e.g., Thompson, 1976), but for those who can, there are substantial gains to be had.

If there are profits to be made by bonding with our animals, it's worth asking, "What *can* we bond with?" Obviously, sustained fear is not conducive to forming the productive relationships chronicled above, and Caine (Chapter 22) found that her monkeys simply did not habituate to the presence of humans, even after repeated exposures. Mather (Chapter 15) also implicitly raises the issue: If we can bond with octopuses, couldn't we conceivably bond with *Aplysia* or locusts or jellyfish? There are no real answers here, merely impressions. Personally, while I like the sand crabs and other assorted "crunchies" I study, it would stretch the word beyond its breaking point to say I "bond" with them. I doubt that my interactions with them change, in any significant or unforeseeable way, their locomotion which intrigues me so. But that's one of the beauties of a book like *The Inevitable Bond*: it makes you consider those sorts of questions.

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