Views of Behavior

Behavioural Ecology. An Evolutionary Approach. J. R. KREBS and N. B. DAVIES. Sinauer, Sunderland, Mass., 1978. xii, 494 pp., illus. Cloth, $34; paper, $17.50.

Ecology and genetics began hybridizing almost half a century ago to form the field of ecological genetics, which has backcrossed with ecology to yield the recent crop of population biologists. In the last decade there has been a progressive introgression of population biology into ethology, a development that under the appellation of sociobiology has caused excitement, alarm, and even fear among biologists, psychologists, and anthropologists. This book conscientiously avoids extending arguments of why animals behave the way they do to why humans might behave the way they sometimes do. The term "sociobiology" is used by only one author, who simply treats it as a synonym of behavioral ecology.

The book is a collection of well-coordinated chapters designed to introduce advanced students to "the latest ideas in behavioural ecology." Most of the chapters are elementary, but current, reviews of how the new generation of field biologists is studying the classic problems of ethology: John Krebs on optimal foraging, Bertram on group living, Heinrich on insect sociality, Harvey and Greenwood on adaptations to predation, Maynard Smith on the ecology of sex, Halliday on sexual selection, Stephen Emlen on cooperative breeding, Partridge on habitat selection, and Horn on life history tactics. These chapters will be excellent reading for students of evolution and their slightly out-of-date teachers.

Innocents will have to be warned that the three dominant themes (dogmata?) of the book remain open to vigorous debate in some circles. In the book Hamilton's notion of inclusive fitness and the resultant theory of kin selection are used to evaluate nearly all interactions among members of a species in terms of the probability that the interacting individuals share genes inherited from a common, but not too distant, ancestor. The mechanisms for the operation of this alluring theory have yet to be thoroughly explored. Optimality theory pervades many chapters and is the focus of one by McCleery. In one chapter animals are said to behave so as to obtain the most profitable rate of caloric intake per unit time. In another chapter behavior is treated as if optimized to enhance copulation frequency. The fact that optimality arguments tend to be *ceteris paribus in extremis* and are only substitutes for direct measures of reproductive success are not stressed enough, in my opinion. The third theme is Maynard Smith's notion of evolutionary stable strategy. An evolutionary stable strategy is a strategy or mixture of strategies that is not susceptible to replacement by an alternative strategy. The criterion by which alternative strategies can be identified seems to depend on the cleverness of the investigator. The modus operandi of the behavioral ecologist, like that of the ethologists before, seems all too often to be make field observations first, compare populations or species, reflect for a time, and then construct a plausible explanation for the observations that is consistent with the latest evolutionary theory. Wishful thinking and empathy with the animals are stronger than the pursuit of a priori hypotheses that can be tested by experiments designed for statistical analysis. A bright companion and a pitcher of beer may be more important to the analysis than a quiet office and a programmable calculator. The discussion of why many large, grazing mammals have white rump patches is an example of multiple plausible arguments without a systematic plan for separating alternative hypotheses.

There are some auspicious chapters. Parker's fascinating, albeit by his admission perverse, studies of mating of *Scatophaga stercoraria* on and upwind of cow pats use probabilistic models to show that the common yellow dung fly acts as if it can judge current resource patch quality and the likelihood it will change, the current level of competitor density in a patch, and the current level of competitor population in relation to the current general habitat quality. McCleery pushes mathematical control theory to the limits of its development when he studies how doves feed and drink and how newts court. A chapter by Dawkins and Krebs on animal signals is an excellent window through which to view how classical ethology is being turned around by the infusion of evolutionary ideas. The old view of animal communication is that of interindividual cooperation as the product of coevolution of actor and reactor in which each informs the other of its internal state. In the new view, in animal communication, as in commercial television, the key word is not information but manipulation, persuasion, or advertisement.

If students buy this book and use it as the focus of seminars designed to generate testable hypotheses and to reexamine old ideas then the union of genetics, ecology, and behavior will be moved forward significantly and in a meaningful direction.

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