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Book Reviews

Gerhardt, H. C. & **Huber**, F. 2002: Acoustic Communication in Insects and Anurans: Common Problems and Diverse Solutions. University of Chicago Press, Chicago. 531 pp. US$100 or £70 (cloth), US$35 or £ 24.50 (paper). ISBN 0-226-28832-3 (cloth); ISBN 0-226-28833-1 (paper)

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For a number of years there was a dearth of new books on animal communication. Fortunately (or perhaps unfortunately if, like me, you are behind on your reading!) this is no longer true. I believe that Gerhardt and Huber's book on acoustic communication in insects (they focus mostly on crickets, grasshoppers and katydids) and anurans is one of the best recent books on animal communication, and I believe it will be of interest to many behavioral biologists.

I should state at the outset that while I study communication I've not worked with insects or anurans. Why should someone generally interested in communication read an entire book focusing on these taxa? Because some of the best work on the production, perception, and function of acoustic signals has been done in these model systems. The book is remarkably diverse, yet this diversity was achieved without losing depth.

The book begins with taxonomically-specific descriptions of sound production where the authors seek to identify common solutions among diverse taxa. The acoustic signals that they are most interested in have mate-attraction and territorial defense functions, and may also function for species recognition. Thus they are subject to both intra- and inter-sexual, as well as natural selection. Some problems these ectotherms face are unique. For instance, temperature has a large impact on signal production, which has led to the evolution of 'temperature coupling': temperature-dependent female preferences. Other problems are commonly faced by all signaling organisms. All signalers must minimize the risk of predation while signaling, manage competition between signalers, minimize energetic costs (they argue against a previous conclusion that acoustic signaling by insects has little if any energetic cost), and produce signals designed so as to 'get the message across'.

I found chapters on the neuroethology of signal production and perception hard-going and of peripheral interest to me. They look like a comprehensive review of the literature. Evidence for command neurons and pattern generators is presented, and feedback on these systems is discussed. A chapter on the neurobiology of peripheral processing highlights a generally important phenomenon – differences between the results of audiograms generated from measuring nerve sensitivity and measures of behavioral preferences. A detailed chapter on central processing follows. I will use examples of the diversity of mechanisms for sound localization in my introductory animal behavior class.

The chapter on signal recognition was excellent and highlights one of the major strengths of insects and anurans as model systems: the ability to systematically manipulate their relatively simple sounds and conduct playback experiments to precisely reveal preferences and to study mechanism.

Everyone is familiar with the conspicuous and remarkable chorusing of insects and anurans. The chapter on chorusing is wonderfully 'Tinbergian' in nature: it moves smoothly between function and mechanism to explain the phenomenon. They conclude that better-designed playback experiments are required to understand the function(s) of chorusing. Moreover, the authors are critical of the 'precedence effect'; a widely reported but not universal mechanism by which there is a preference for leading signals, when two or more individuals simultaneously call.

The remaining chapters focus broadly on the function and diversity of signal variation. I was aware of the excellent literature on the heritability of acoustic properties in insects, but was unaware that there are no similar studies for anurans. The authors call for more complex playback experiments to understand function in more realistic scenarios.

One of the take home messages in this book is that the study of mechanism and diversity reveals the opportunistic nature of evolution. Thus, the authors remind us that there is unlikely to be a universal explanation for the evolution of communication. Other themes repeated throughout the book

include that to understand the evolution of communication, it is essential to understand perception, because receiver mechanisms are as labile as signals.

One of the best things about the book is that the authors generously highlight outstanding research questions at the end of each chapter. Many of these questions are not restricted to insects or anurans, but are more generally applicable. Thus, the book is a veritable gold-mine for graduate students looking for contemporary projects in communication, and the book creates a bench-mark by which future advances can be evaluated.

Some topics are notable in their absence because neither insects nor anurans are an appropriate model system. For instance, Hauser (1996) adopts a much more cognitive approach and includes discussions of signal meaning. The ontogeny of communication is better studied in avian model systems.

There are four useful, albeit brief, appendices: (i) the theory and analysis of communication (more information in Bradbury and Vehrencamp 1998), (ii) the analysis and description of acoustic signals (more details in Charif et al. 1995 or Hopp et al. 1998), (iii) a brief description of environmental acoustics, and (iv) a six page table summarizing patterns of female preferences for acoustic properties of long-range signals.

The 63-page bibliography is extensive and up-to-date. The index seems complete and was useful; I easily found topics of particular interest. The figures throughout the book are all redrawn and are exceptionally well done. The production standard is high, although I found the font small, and the pages densely packed.

In a nutshell, this is a book that should be on the bookshelf of anyone interested in animal communication or who wishes to develop lectures on communication for their animal behavior or neuroethology classes. It would make a particularly good book from which to structure an interdisciplinary graduate seminar.

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Lott, D.F. 2002: American Bison. A Natural History. University of California Press, Berkeley. 229 pp. $ 30.00. ISBN 0-520-23338-7.

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One of the good things about getting older is that the food at parties improves. The other thing is that a scholar may find himself with something significant to say and a willingness to speak his mind openly. Such is the case with Professor emeritus Dale Lott's engaging book in which the author tells us what he knows about the keystone ruminant of the North American grassland, why anyone should care about the future of this species, and how a long-term future might be secured.

This rather short book is divided into six parts that comprise 25 chapters. Each chapter is a short, distilled treatment, a vignette almost, of a particular topic. The first three chapters deal specifically with behavior and focus on the common social interactions that one sees in the bison rut, between bison cows as they forage and assert dominance, and between bison mothers and their young. Here and elsewhere throughout the book where Lott touches on a behavioral topic, the emphasis is on the fitness value of behavior, and a recurring theme is that behavior designed to maximize individual fitness may not always seem pretty or for that matter, to make intuitive sense. Lott's message to the lay reader, for whom this book is largely written, is that evolutionary biology can explain and sometimes successfully predict outwardly inexplicable behavior.