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The Question of Animal Culture

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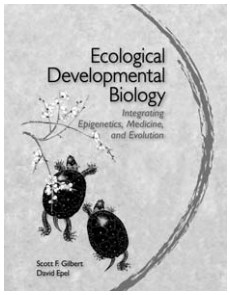
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written mainly to achieve goal one—that is, to convey enthusiasm for the new field and its way of looking at the world—and the book is fully successful at this level. Although I have some quibbles, the material is generally well presented and should capture the attention and interest of biologically savvy students. I note that although the illustrations are generally excellent, the captions accompanying them are too often inadequate. Many figures are poorly described—axes on graphs are sometimes lacking and legends are incomplete. In chapter 5, for example, several comparisons of normal and abnormal development are presented (e.g., figures 5.3 to 5.6), but insufficient detail is presented for the reader to conclude much more than that the examples look different.

This brings us to the final chapter, and to goal two of forging a new conceptual synthesis. You may have already mused, "This idea of merging development and plasticity sounds familiar," and asked yourself, "Hasn't this been done already (with the exception of incorporating human health)?" And you're right—books by both Schlichting and Pigliucci (1998—way back in the 20th century, but not cited by Gilbert and Epel) and West-Eberhard (2003) undertook the melding of plasticity, development, and evolution. So it is a fair question to ask what, with the exception of incorporating human health, the authors add to the previous syntheses. Does eco-devo add significantly to our views of how evolution operates?

Gilbert and Epel suggest that eco-devo upends three supports of the modern synthesis: that only heritable variation is important, that organisms are unitary, and that the environment's only role is as a selective agent. They argue that eco-devo, in contrast, shows that both epigenetic and environmentally induced variation are important, and that organisms are more like ecosystems. In their view, eco-devo's key innovations are epigenetic inheritance, heterocyberny (an appalling new term for genetic accommodation), and niche construction, and each receives treatment in the final chapter. Since each of these has had a major book devoted to it (Odling-Smee et al. 2003, West-Eberhard 2003, Jablonka and Lamb 2005), the new synthesis must be in their combination, but in the end Gilbert and Epel are not able to tie them together in new ways.



Ecological Developmental Biology also has a coda on philosophy and eco-devo, and four text appendices. Appendix B expands on topics covered less fully in the text (e.g., epigenetic mechanisms such as methylation). Appendices A, C, and D offer some historical context for the progress of evo-devo and eco-devo. I found these sections very uneven—interesting observations alternate with purple prose, and the failure of plasticity studies to gain a foothold in Western science is all Lysenko's fault. Overall, I have to deliver one thumb up and another down. The book succeeds in its goal to provide a taste of the excitement and intrigue of viewing organismal biology through the lens of plasticity. However, for me at least, it does not deliver on its promise of a new synthesis.

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DEFINING CULTURE IN ANIMALS

The Question of Animal Culture. Kevin N. Laland and Bennett G. Galef, eds. Harvard University Press, 2009. 351 pp., illus. $49.95 (ISBN 9780674031265 cloth).

Ever since a troop of Japanese macaques began washing sweet potatoes in a stream, scientists have described, argued, and marveled at the degree of culture demonstrated by nonhumans, and wondered what these observations had to say about human culture. *The Question of Animal Culture,* edited by Kevin N. Laland and Bennett G. Galef, is the first, most scientific, and challenging look at what culture means for animals ranging from birds to nonhuman primates.

The question of whether the traditions of animals and cultures of humans are similar is very contentious, and this book is an excellent, timely compendium of the thoughts and research of the best scientific minds as they address this issue. The approach is one of rigorous scientific inquiry and dialogue, with the recognition that this is an important, viable, and expanding field that has matured to develop paradigms, methods, and theories to describe and categorize behavioral patterns that might represent culture in animals. Also up for consideration is the question of whether

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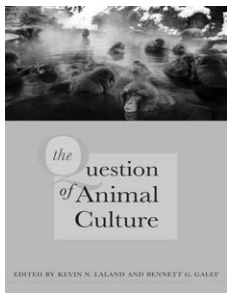
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such patterns truly constitute culture. And the book did make me think, consider, and want to read more as it brought alive the "cultural" behavior patterns of a range of different animals.

The main task of *The Question of Animal Culture* is to bring together the best minds to provide their research and perspectives on animal culture, to provide the data they feel addresses the question of culture in animals, and to consider the ways in which animal and human cultures are similar or different. The book accomplishes this task both credibly and elegantly. Indeed, it assembles some of the most noted scientists in this field, including Frans DeWaal, Michael Tomasello, Kim Sterelny, and Kim Hill. The chapters cover a wide range of topics, including the social side of primate culture, chimpanzee culture, wild great apes, and bottlenose dolphins, among others. To be sure, opinions are varied and contradictory, and it is up to the reader to decide the final answer, given our current state of knowledge, which *The Question of Animal Culture* sums up. I happened to find all of the arguments about the definitions of culture and the evidence for culture both persuasive and intriguing.

The introduction to the book, as well as the final three chapters (by Susan Perry, Kim Hill, and Kim Sterelny), give the broadest overview of the topic, the controversies, the evidence, and the remaining questions. It is clear from their work, and that of others throughout the book, that this research topic will continue to be stimulating and important for primatologists, psychologists, behavioral ecologists, and anthropologists, as well as ethics and religious scholars. It will also appeal to a lay audience.

Central to the book and to the question of animal culture is the definition of culture. To some extent, how one defines culture surely influences whether the social behavior of animals is understood to represent culture or not. Factors that make up demonstrations of culture include such things as the spread through social learning of behavioral innovations (such as macaques' hand washing or birds' development of distinct dialects), traditions of aberrant behavior (population-specific behaviors), and information passed across generations as learned traditions (site-specific social behaviors that remain constant over generations). Culture is also defined as the transfer of information by behavioral means. Some scholars, such as Bennett Galef and Michael Tomasello, argue that culture demands a clear demonstration that traditions are a consequence of social learning, and that both imitation and teaching are required.



Evidence that traditions and behavioral aberrations occur among widely dispersed populations of a given species is incontrovertible, and the evidence that such behavior is learned and transmitted is strong. What remains controversial is the implied homologies with human behavior. William McGrew clearly describes variations in chimpanzee behavior across different populations of chimpanzees; Carel van Schaik describes interpopulation and group-specific behavioral repertoires in orangutans; and Hal Whitehead examines these patterns in whales and dolphins. It is these issues that are strongly woven throughout the book in an elegant and stimulating manner. I would have enjoyed more discussion of the role of culture in birds, as the emphasis in the book is on primates and cetaceans, yet some of the classic examples come from bird dialects and tool use.

To some extent, the issues of whether animals have culture or not reminds me of the nature-nurture arguments of the last century. In the end, it was not a matter of what was nature and what was nurture, but rather what was the genetic basis for learning and how much of any given behavior pattern was learned versus innate (and how did these interact). Perhaps the arguments about whether animals have culture or only humans do are similar. Perhaps there is a false dichotomy between the two positions. It may not be a matter of whether animals have culture, but of how much and to what degree their culture is similar to or different from human culture; and to what extent do the processes vary between animal culture and human culture. Although animals clearly teach one another and their offspring (or at least offspring learn from parents and one another), the elaborate teaching and learning infrastructure so highly developed in humans is absent. Culture in humans may be a quantum leap from that of other animals, and thus understanding culture in animals may not in itself tell us a lot about the development of human culture. This question remains open in the book and in the current scientific dialogue.

The Question of Animal Culture is well written and well organized, the authors are the giants in the field, the research is rigorous, the issues and topics are discussed and argued convincingly, and the book is fun and interesting to read. This landmark compendium of current thought describes well the serious debate about culture in animals. I recommend it highly.

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KNOW YOUR ENEMY

Bioeconomics of Invasive Species: Integrating Ecology, Economics, Policy, and Management. Reuben P. Keller, David M. Lodge, Mark A. Lewis, and Jason F. Shogren, eds. Oxford University Press, New York, 2009. 320 pp. $49.95 (ISBN 9780195367973 paper).

More than 50,000 species of plants, animals, and microbes that have

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