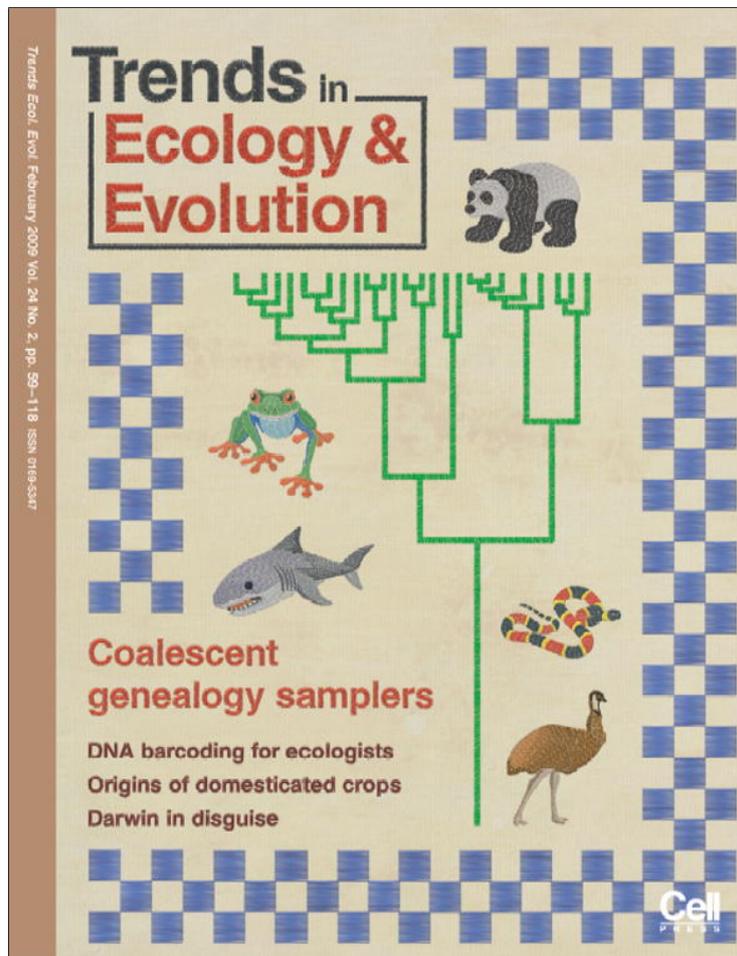


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more with evolutionary questions than with anything else. As stated in Ines Hellmann and Rasmus Nielsen's chapter about human evolutionary genomics, 'Evolution is no longer a topic reserved for dedicated evolutionary biologists, but is of core importance for any person interested in developing a full understanding of genomics.' For example, neutral evolution cannot be neglected when studying how transcription factors bind to DNA, as revealed during the ENCODE project [1]. On a similar note, it is important to understand why God might very well have created 'junk' DNA, at least if (s)he follows the rules of population genetics [2]. Genomics brings us closer than ever to Dobzhansky's overcited 'nothing in biology makes sense except in the light of evolution,' and there is ample need to summarize what has been learned so far about genomes and their evolution.

Pagel and Pomiankowski have gathered leading experts in the field who highlight 12 topics that have gathered growing momentum in recent years from the available omics data. They cover areas such as lateral gene transfer, the evolution of gene expression, methods to detect selection in DNA sequences, sex chromosome evolution, the origin of new genes and how selection could shape biological network structures. The single chapters provide excellent introductions and overviews of their respective research questions, and together they give a good sense of

the different approaches used to tackle evolutionary questions with genomic data. However, they also do not give much more than just a sense; by necessity, such an edited volume cannot seamlessly string its chapters together, and the volume's overall coverage of the field is only spotty. Thus, the book is well suited for students and experts interested in evolutionary genomics or particular aspects of it, but less suited for people seeking a structured survey of the entire field. Another problem with a volume on such a rapidly moving field like evolutionary genomics is that it will be outdated in a few years, and one is then better advised to read newer reviews. Some chapters that closely detail current debates will meet this fate earlier than others. Nevertheless, for now, this is an excellent book for anyone interested in the questions and insights that have been gathered from the high-dimensional language in which life has evolved.

References

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- 2 Lynch, M. (2007) *The Origins of Genome Architecture*, Sinauer Associates

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doi:10.1016/j.tree.2008.08.009 Available online 26 December 2008

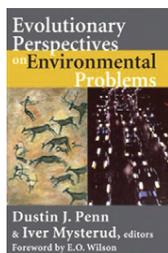
Book Review

Does an evolutionary perspective help understand environmental degradation?

Evolutionary Perspectives on Environmental Problems edited by Dustin J. Penn and Iver Myrsterud, Transaction Publishers, 2007, US \$59.95 (hbk), US \$29.95 (pbk) (364 pages) ISBN 978-0-202-30754-1 (hbk), ISBN 978-0-202-30755-8 (pbk)

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There can be no doubt that humans are the products of organic evolution, and that an understanding of the evolutionary processes that shaped the human lineage provides the ultimate explanation for why we are the way we are. However, this fact does not necessarily mean that evolutionary theory will provide useful insights into human behavior. Evolutionary processes are complex, and past environments are poorly known. Sometimes evolutionary reasoning yields sharp, novel insights, and sometimes it does not. It all depends on the application. *Evolutionary Perspectives on Environmental Problems* describes a range of research taking an evolutionary perspective on the crucial and timely problem of environmental degradation. The papers, published over the past 20 years, are well chosen and represent a good sampling of evolutionary

social science. They also illustrate both the power and weaknesses of evolutionary reasoning.

The power is illustrated by the excellent work on the lack of conservation in small-scale societies. Most researchers agree that modern societies have created serious environmental problems, from the pell-mell destruction of natural habitat to the pollution of the atmosphere. However, many people believe such impacts are a pathological consequence of urban, market societies, and that small-scale societies, especially hunter-gatherer societies, have well-adapted belief systems that cause them to live in harmony with their environment. The modern revolution in evolutionary theory of behavior began with the debunking of exactly the same reasoning applied to other animals by V.C. Wynne-Edwards, who believed, for example, that birds restricted their reproductive output to avoid over-exploiting their resources. Evolutionary thinkers do not believe that other animals are natural conservationists, and see every reason to believe that the same conclusion applies to small-scale human societies. The exemplary

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empirical work by Michael Alvard, Ray Hames and Bobbi Low reprinted here provides strong support for this prediction. Small-scale societies do not typically have beliefs or institutions that protect their environments.

What is not so clear is why this should be the case. The received wisdom in evolutionary social science is that natural selection acts at the level of individuals or kin groups and, as a consequence, selection should lead to a psychology that causes people to convert resources into offspring without much concern for the effects on the population in which they live. This means that, as the chapter by Alan Rogers convincingly shows, people should be short sighted and, perhaps, as the chapters by Jim Boone and others argue, should strive for status and the goods that signal that status. It is easy to see how selfish motives, short-sighted planning and the need to finance competitive displays will lead to environmental problems such as population growth and overexploitation of resources. The positive effect on the group of individual efforts is smaller than the individual cost. Moreover, this is not just economics in another guise: evolutionary reasoning can provide novel insights into people's motives, as evidenced by the chapters by Martin Daly and Margo Wilson on sex differences in environmental attitudes.

So far so good. But here is the problem: unlike other creatures, people do regularly solve large-scale collective action problems, just not environmental ones. Group

defense is a good example. Warriors in small-scale societies frequently risk life and limb to benefit groups numbering in the hundreds or sometimes thousands. They are motivated to do this by moral systems and institutions that reward the brave and punish the craven. Moreover, some societies do have norms and institutions that lead to the solution of environmental problems, as documented in the chapters by Lore Ruttan and by Elinor Ostrom. How human populations come to have norms and institutions that regularly solve some kinds of collective action problems whereas other animals do not is a difficult question, and there is no consensus among evolutionary social scientists about the answer [1]. However, the fact remains that they do, and this means that, at present, an evolutionary perspective does not provide clear answers to the most important questions about human environmental degradation. The editors, Dustin J. Penn and Iver Myrsterud, are aware of this issue, and in the last chapter provide a useful sketch map of possible solutions within an evolutionary framework. Perhaps, if there is a second edition of this useful book ten years hence, it will provide a more definitive answer.

Reference

- 1 Hammerstein, P. (2003) *The Genetic and Cultural Evolution of Cooperation*. MIT Press

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doi:10.1016/j.tree.2008.10.003 Available online 25 December 2008