

## The Selfish Book

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overview of the biodiversity crisis that forms the book's context and rationale. Subsequent chapters examine the keystone species concept; species interactions in natural communities; water; soil; plant productivity; the role of animals in shaping the landscape; and the influence of organisms and ecosystems on climate and atmosphere. Lest these brief paraphrases of chapter headings suggest dull or routine treatments, here are the section titles of the chapter "Water: The Essence of Life": Waterlogging and Salt Scalding; Growth of Deserts; Grass Versus Thickets on the Savanna; Water Harvest; Alien Trees, Water Yield, and Erosion; Erosion and Nutrient Runoff; Consequences of Overfishing; Alien Fish and a Dying Lake; Beavers, Fallen Logs, and Healthy Streams; and Mangrove Forests and Coastal Fisheries.

Even this listing of one chapter's subsections (and those of the other chapters are equally varied and wide ranging) hardly does justice to the wide angle, high-resolution lens through which Baskin views the biosphere. Her reporting is graceful and lucid, and amply documented by citations from both the primary research literature and reviews.

One small complaint: The cited literature is gathered in a Notes section at the end of the book; it is arranged by chapter number but without chapter titles, whereas the headers on each page of the text give chapter titles without their numbers. This format makes for a lot of flipping pages back and forth to find citations. How much easier it would be for the reader to find citations at the end of each chapter or, at least, to have chapter numbers on each page and chapter titles in the Notes section. Readers wishing to turn frequently to the Notes may wish to pencil brief chapter identifiers in that section.

SCOPE's objective of accessibility has been amply fulfilled. As for timeliness, the other publishing objective, only time itself will tell. We must hope that the contemporary biosphere has enough resilience to withstand our assaults while we search urgently for sustainable alternatives to our destructive practices. To that end, *The Work of Nature* should be widely read and discussed.

Indeed, it should be required reading, especially for the techno-optimists among us.

Sustaining biodiversity—that must be our goal. In showing us why, Baskin, SCOPE, and the publisher, Island Press, are themselves performing what is surely, for our species at least, a keystone ecosystem service.

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#### Reference cited

Thompson WI. 1991. *The American Replacement of Nature: The Everyday Acts and Outrageous Evolution of Economic Life*. New York: Doubleday.

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### THE SELFISH BOOK

**The Origins of Virtue: Human Instincts and the Evolution of Cooperation.** Matt Ridley. Viking Press, New York, 1997. 295 pp. \$24.95 (ISBN 0-670-87449-3 cloth).

Why do humans behave in the uniquely cooperative way we do? This question has puzzled thinkers for centuries. To address it, zoologist Matt Ridley has produced an engaging and entertaining synthesis of a broad range of theoretical and empirical information from both the natural and social sciences. The ground covered includes such diverse territories as social insects, Adam Smith's ideas on the division of labor, the prisoner's dilemma in its many incarnations, the evolutionary advantages of emotions, reciprocal blood sharing among vampire bats, David Ricardo's theory of comparative advantage in trade, and the ever-interesting social behavior of non-human primates.

Given the goals of this broad-ranging synthesis, I was hoping for something more than the "Russian doll" model of reductionist science—the belief that the explanation for complex phenomenon always resides at the lowest level. For example, because society is made up of individuals, reductionists argue that explanations of social behavior that originate at the individual level are the most "fundamental." Although conceptually simple and therefore appealing, the reductionist approach

continues to come under heavy criticism from many quarters (Williams 1997). One of the fundamental debates in science continues to center on just how much of the behavior of complex systems can be explained from the behavior of the parts without recourse to higher levels of organization (Wilson and Botkin 1990).

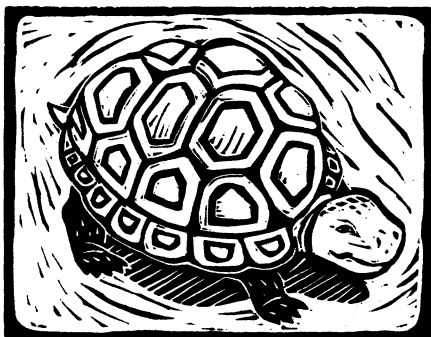
In many ways, Ridley does go beyond the Russian doll model, but, interestingly, he fails to acknowledge this fact, preferring instead to leave the (not quite explicit) impression that his examples and synthesis fully support the reductionist approach. But this interpretation is certainly not self-evident. For example, one chapter focuses on John Maynard Smith's model of "hawks and doves," a game similar to the more famous "prisoner's dilemma," in which cooperative behavior can evolve even in situations in which the optimal strategy in single encounters is to defect. Cooperation can win out if repeated encounters with the same individuals occur and if it is possible to remember what the other individual did during previous encounters.

Although Ridley obviously thinks that such game theoretical models of the evolution of cooperative behavior through reciprocity support the reductionist approach, Maynard Smith himself contends that "Game theoretical models move up rather than down the reductionist scale" (Williams 1997). Can the behavior of groups (particularly their cooperation with each other) be explained completely from the behavior of individuals (or more fundamentally their genes)? Or is something more required? Ridley seems to think that if something more is required, then the theory does not qualify as an explanation, foreclosing even the possibility of higher level selection. However, I, for one, do not find his arguments convincing.

Consider an analogy in written language. Individual letters make up all (western) written languages. One could thus argue—taking the reductionist line—that all meaning in language must be reducible to letters, the fundamental units from which all language is built. The absurdity of this conclusion should be obvious. Although letters are, indeed, the building blocks of written language,

it is the pattern of letters combining into words, words into sentences, and sentences into complete thoughts that give language its meaning. These patterns are the product of constraints and "selection" imposed at the level of words, sentences, and so on. Likewise, cells, individuals, species, communities, and ecosystems can all be considered as larger patterns built from component parts. The information content in these patterns cannot be reduced completely to the blocks that are used to form them. It makes no more sense to reduce all life to the behavior of individuals or their genes than it does to reduce all written language to the letters from which it is built. One needs to understand the complex patterning of life as a multiscale phenomenon, with selection occurring simultaneously at multiple scales.

Reductionists are right to stress that genes and individuals cannot be ignored, but they are wrong to contend that all other factors can be ignored. In human societies, there must be a consistency between individual goals and social goals; otherwise, a "social trap" occurs with the goals of the individual taking precedence over the goals of the society, which results in the social goals not being met (Costanza 1987). But this fact does not mean that individual goals can completely explain social goals. Selection at the social level still exists, but it goes on in conjunction with selection at lower levels and must be concordant with those lower levels. Just because the results of selection are stored and passed on in the genes does not mean that "selfish genes" control the process any more than the fact that culture is stored in libraries means that "selfish books" control culture, trying to push copies of themselves into the future.



Ridley also focuses on only two paths to cooperative behavior: reciprocity and kin selection (and kin selection is given only passing reference). Both paths can be explained within the reductionist "selfish gene" paradigm (Dawkins 1976). But, as Dugatkin (1997) points out, there are two other, probably more common and important, paths to cooperation: byproduct mutualism and group selection. Although group selection certainly remains controversial, Ridley's out-of-hand dismissal of this path to cooperation is not warranted. For example, there is credible theoretical and empirical evidence for group (nonkin) selection in foraging ants (Rissing et al. 1989, Seger 1989, Wilson 1990, Wilson and Sober 1994).

An even easier road to cooperation is through byproduct mutualism (Connor 1995), which occurs when the immediate benefits of cooperation outweigh the immediate costs. Some scientists argue that this path should not even be considered to be cooperation, because there is no temptation to cheat. But for this very reason, it may well be the most common path to cooperation (Dugatkin 1997). Perhaps cooperation is so common because in many situations it simply pays—directly—to cooperate, even without the complex reciprocal, kin, and group dynamics that have been developed to explain those more difficult situations in which cooperation is not so obviously or directly beneficial. But byproduct mutualism is not even mentioned in Ridley's book.

Ridley's final chapter, entitled "Trust: in Which the Author Suddenly and Rashly Draws Political Lessons," explains much about the reasons for the interpretations and omissions in previous chapters. Ridley reveals himself to be a political conservative of the Margaret Thatcher variety, even quoting Ms. Thatcher's notorious views on the subject at hand: "There's no such thing as society. There are individual men and women, and there are families" (p. 261). To this idea, he adds his own political lesson: "If we are to recover social harmony and virtue, if we are to build back into society the virtues that made it work for us, it is vital that we reduce the power of the

state" (p. 264). Ridley believes that humans cooperate instinctively and that the organized state only confuses and corrupts those instincts: "The roots of social order are in our heads, where we possess the instinctive capacities for creating not a perfectly harmonious and virtuous society, but a better one than we have at present" (p. 264). But if this assertion is true, why did states, governments, religions, and other cultural institutions and traditions need to evolve in the first place?

The synthesis Ridley offers (and even more the things left out) do not support his rashly drawn political lessons. People behave cooperatively for a number of complex reasons, some of which have become embedded in our genes and "instincts," and others of which remain at the level of learned cultural responses. These cooperative behaviors all lead to individuals in the society being better off, but understanding this process requires a multiscale perspective. Humans have the instinctive capacity to cooperate if such behavior is consistent with individual short-term interests, but religion, government, cultural traditions, and other mechanisms are needed to adjust the short-term individual incentive structures to be consistent with longer-term social benefits (Costanza 1987). Selection occurs at several levels of organization (even though the results may be stored and transmitted through genes and culture). Although cooperation may reflect enlightened self-interest, the source of the light is society itself and its own survival.

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## References cited

- Connor RC. 1995. The benefits of mutualism: A conceptual framework. *Biological Reviews* 70: 427-457.
- Costanza R. 1987. Social traps and environmental policy: Why do problems persist when there are technical solutions available? *BioScience* 37: 407-412.
- Dawkins R. 1976. *The Selfish Gene*. Oxford: Oxford University Press.
- Dugatkin LA. 1997. The evolution of cooperation: Four paths to the evolution and maintenance of cooperative behavior. *BioScience*

- 47: 355–362.
- Rissing S, Pollock G, Higgins M, Hagen R, Smith D. 1989. Foraging specialization without relatedness or dominance among co-founding ant queens. *Nature* 338: 420–422.
- Seger J. 1989. All for one, one for all, that is our device. *Nature* 338: 374–375.
- Williams N. 1997. Biologists cut reductionist approach down to size. *Science* 277: 476–477.
- Wilson DS. 1990. Weak altruism, strong group selection. *Oikos* 59: 135–140.
- Wilson DS, Sober E. 1994. Re-introducing group selection to the human behavioral sciences. *Behavioral and Brain Sciences* 17: 585–654.
- Wilson MV, Botkin DB. 1990. Models of simple microcosms: Emergent properties and the effect of complexity on stability. *American Naturalist* 135: 414–434.

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## NEED AND GREED ON THE LAST FRONTIER

**Tropical Deforestation: The Human Dimension.** Leslie E. Sponsel, Thomas N. Headland, and Robert C. Bailey, eds. Columbia University Press, New York, 1996. 365 pp. \$19.50 (ISBN 0-231-10319-0 paper).

Tropical deforestation continues unabated after two decades of rhetoric by governments and international organizations alike and in the face of increasing popular recognition that it is contributing to human misery in the tropics and will contribute to a lower quality of life worldwide in the near future. This very nicely organized, fact-filled volume from Columbia University Press's *Biology and Resource Management in the Tropics and Methods and Cases in Conservation Science* series examines tropical deforestation from numerous anthropological perspectives to identify causes and offer possible solutions. In each chapter, the authors conclude by drawing lessons from their case studies that can be useful for changing current policy. The editors are field anthropologists with extensive experience in the tropical regions most subject to current and future deforestation, so their choice of case studies provides pertinent examples that are representative of all of the tropics.

The book is divided into five sections. The first is a single chapter in which the editors provide a concise overview of tropical forests: their worth, the causes and consequences of their loss, and some ways to preserve them. The editors note that

deforestation is driven by need and greed, both of which are the result of political and economic policies chosen by national governments and international development organizations, especially the World Bank and the International Monetary Fund.

The two chapters in the second section discuss prehistoric deforestation. Elliot Abrams, AnnCorinne Freter, David Rue, and John Wingard show that the collapse of the Late Maya civilization in Honduras was caused in part by population pressures that led to mismanagement of the forests. Brien Meilleur shows that the occupation of Polynesia was accompanied by extensive deforestation and extinction of endemic plant and animal populations.

The third section contains two chapters that discuss historical deforestation in colonial India and Kenya. Both chapters illuminate the major lesson of the book, namely, that deforestation results from political and economic policies that deny the rights of native peoples to their land and its resources. Janis Alcorn and Augusta Molnar show that before the British arrived, the Indian subcontinent was a patchwork of small to medium kingdoms in which peasant communities had almost total control over their forests. As Britain consolidated control over the subcontinent, the forests were brought under state control and peasants were denied their traditional rights to the forests. The result was increasing deforestation, which in turn increased hunger and poverty by reducing access to previously "free" forest resources, such as food, construction materials, and firewood. The Indian forest service has begun work in partnership with peasants to restore some previously forested areas, with variable success; where such partnerships are not being tried, environmental deterioration and poverty continue.

In Kenya, as Alfonso Castro shows, the history of deforestation is somewhat different, but it also involved the loss of peasant control over their resources, especially land rights, resulting in deforestation and increased hunger and poverty. Early in this century, several districts developed farm-level forestry programs that succeeded in increasing forest

cover and reducing hunger and poverty, but these programs were abandoned during the turmoil of independence and are only now being revived.

The fourth section contains five chapters about modern deforestation. These chapters examine this topic from a political-economic perspective, both national and international. Emilio Moran's chapter on the Brazilian Amazon is especially disturbing because he predicts increasing violence against the disenfranchised human population and accelerating deforestation that can be avoided only if the current business-as-usual approach is changed. Eduardo Bedoya and Lorien Klein examine the effects of the US anti-drug program on humans and their environment in the Peruvian Amazon. Again, the report is disturbing because it clearly shows how the lack of political will in the United States to address the reasons for drug use can negatively affect people in other countries who are only responding to an economic opportunity where no other good opportunities exist. Susan Stonich and Billie DeWalt's chapter on Honduras is especially thought provoking because it shows that accepted development strategies—the export of agricultural commodities, as encouraged by the United States and international development organizations—are the root causes of increased deforestation and consequent hunger and poverty. The increased deforestation is expected because deforested land is necessary for farming; the increased hunger and poverty are not expected, but they are certainly the most common outcomes of the export-led "development" espoused by the United States and international development organizations.

James Vandemeer, the only non-anthropologist in the book, uses a political-economic perspective to compare deforestation in Nicaragua and Costa Rica during the 1980s and 1990s. This chapter is especially interesting because it contrasts two "treatments" over 15 years and the reversal of one treatment after 10 years. Treatment 1 took place in Nicaragua, where, in the 1980s, the Sandinistas and President Reagan were in power and at war. The Sandinistas returned control over