RETIRED AGRICULTURAL ECONOMIST SPEAKS OUT

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Stories of Global Change

The Earth Remains Forever: Generations at a Crossroads. Rob Jackson. University of Texas Press, Austin, 2002. 169 pp., illus. $18.95 (ISBN 0292740557 paper).

Environmental scientists often write essays intended to inform the general public about key environmental problems. These books are difficult for the professional to judge. We can assess their scientific accuracy. But since they cover familiar territory at an introductory level, it is hard to enjoy them, even though they may be both entertaining and edifying for the intended audience. Rob Jackson's *The Earth Remains Forever* is a happy exception to this problem. Jackson's book is accessible to the general reader, it is accurate in the areas it covers, but most important, it is extremely engaging even for those already familiar with the global environmental problems he discusses.

Jackson examines the three major components of global environmental change: biodiversity loss, ozone depletion, and climate change. He reviews the evolution of both science and policy around these pressing issues, and he offers reflections on what we might do to reduce the human footprint on the earth. The key to his exposition is the use of case studies and the historical development of science around each of these topics. The historical approach is what makes the book entertaining even when it covers familiar ground. His stories make clear the interaction between knowledge and action. And unlike many popular treatments, *The Earth Remains Forever* emphasizes the way scientific understanding evolves. Caution in drawing conclusions, alternative hypotheses that have fallen by the wayside, and the limits in current understanding all feature prominently in Jackson's exposition. Readers will emerge with basic knowledge of each of these three major global problems. In addition, because Jackson emphasizes the complexities and uncertainties in environmental research, the reader will learn to think critically. It is rare to find a volume that builds such an important conceptual foundation and at the same time is such an entertaining read. Scientific uncertainty is increasingly being invoked as an excuse to take no action on critical environmental problems. By helping the reader understand how science evolves, Jackson provides a useful vaccine against many such specious arguments about environmental policy.

But *The Earth Remains Forever* also has a major flaw, one that would preclude my recommending it for an introductory environmental science course. Jackson is very competent at dealing with the physical and biological science literature on global change. But he seems completely unaware that there is a literature in human ecology/environmental social science that is at least as important as the literature he cites. In well over 200 references, fewer than 10 connect with the human ecological literature, and even these are not deployed effectively in his presentation.

This greatly weakens his exposition. Many important points are supported only by argument from first principles and statistical abstracts rather than by scientific analysis. Like most biologists, he emphasizes the importance of human population as a driver of environmental

problems but also takes account of affluence and consumption. But he does so without engaging the literature (e.g. Stern et al. 1997), and as a result his analysis lacks subtlety. The literature on ecosystem services could substantially bolster his arguments regarding the value of biodiversity, which I fear will not be convincing to a skeptic (National Research Council 1999a). His discussion of discount rates (pp. 114–115) does not address key arguments in environmental and ecological economics. As a result, his position seems naïve. Jackson gives considerable attention to international environmental treaties. We know a great deal about governing the environment with institutional arrangements such as treaties, markets, regulations, and voluntary agreements (e.g. Ostrom et al. 2002). The literature on environmental treaties is especially rich. It is surprising Jackson does not build on this research, since it offers important insights into what works and what doesn't and why. He repeatedly discusses individual decisionmaking as the nexus for dealing with environmental problems. Yet he ignores the literature on what can and cannot be expected from individual behavioral changes (National Research Council 1999b).

It is unfortunate that a book that is both entertaining and useful is so deeply marred by this blind spot. Perhaps a decade or two ago the shift from discussions grounded in science to speculation on the human dimensions of environmental problems might have been acceptable. Now it sharply limits the utility of the book as a text. I hope that if Jackson undertakes a second edition or a new volume along these lines, he will take the time to engage with the full scientific literature on the subjects he tackles. And although I would not use *The Earth Remains Forever* in the classroom, I can imagine leaving a copy of it next to the Gideon Bible in a hotel room, in the hopes that a bored guest might read it. I can imagine that a business traveler, after spending an evening with Jackson's book, would have a better appreciation for the importance and complexity of the problems we face. A careful reader of Jackson's book would be better equipped to see through the facile rhetoric currently being deployed to avoid action on global environmental problems.

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References cited

National Research Council. 1999a. Perspectives on Biodiversity: Valuing Its Role in an Everchanging World. Washington (DC): National Academy Press.

———. 1999b. Human Dimensions of Global Environmental Change: Research Pathways for the Next Decade. Washington (DC): National Academy Press.

Ostrom E, Dietz T, Dolsak N, Stern PC, Stonich S, Weber E, eds. 2002. The Drama of the Commons. Washington (DC): National Academy Press.

Stern PC, Dietz T, Ruttan VW, Socolow RH, Sweeney J, eds. 1997. Environmentally Significant Consumption: Research Directions. Washington (DC): National Academy Press.

IS POPULATION ECOLOGY A MATURE SCIENCE?

Complex Population Dynamics: A Theoretical/Empirical Synthesis. Peter Turchin. Monographs in Population Biology 35, Princeton University Press, Princeton, NJ, 2003. 536 pp. $29.95 (ISBN 0691090211 paper).

In the preface to this book, Peter Turchin clearly lays out its themes and functions: to review the current understanding of why populations oscillate, to synthesize the empirical and mathematical components of population ecology, to demonstrate that population ecology is on the "brink of maturity" in becoming a predictive science, and to communicate these themes to professional scientists and students alike. This is an ambitious undertaking, even though

Turchin limits the scope of his themes by excluding both the spatial and the exogenous stochastic components of population processes. An additional intended function of the book, which becomes clear only toward its end, is to provide a decisive rejoinder to the fifth of seven principles laid out by Charles Krebs (1995) in analyzing the role of disease in population regulation: "Avoid mathematical models. They are more seductive than useful at this stage of the subject" (p. 9). Turchin pulls no punches in his criticisms of Krebs's work or of several other studies that he dissects in this book. This is good: It is what science is about. So I trust that Turchin will not object when I raise a few criticisms of his own approach to science.

But first some laudatory comments. Turchin certainly constructs a more thorough and persuasive argument for the maturity of population ecology as a predictive science than anyone else I have read. In doing so, he lays out a strong case for the importance of models in pushing forward the frontiers of population ecology. Turchin has as much experience as any quantitative scientist in melding theory and empiricism in population ecology, and he ably demonstrates this in the six chapters that constitute the section of his book titled "Case Studies." This section is preceded by a three-chapter section on data, which in turn is preceded by a five-chapter section on theory.

In many ways Turchin's book is a *tour de force,* but it also has some notable weaknesses. These weaknesses do not detract from the book's importance as required reading for students and professionals in population ecology. But it is not the kind of text that the author promises in his preface, where he states, "I am assuming very little mathematical background on the part of the reader" (p. xii). True, chapters 3 and 4, "Single Species" and "Trophic Interactions," do ease the reader into population modeling. The next three chapters, however—"Connecting Mathematical Theory to Empirical Dynamics" (chapter 5), "Empirical Approaches: An Overview" (chapter 6), and "Phenomenological Time Series Analysis" (chapter 7)—are more technical and much more difficult to understand for anyone without prior exposure to these topics. This is disappointing, given Turchin's express interest in having *Complex Population Dynamics* used as a textbook. Some additional background material on time series analysis, for example, is needed for chapter 7 to fulfill its promised didactic function.

A colleague and I assigned the book for a graduate course in population modeling this past spring. It was not nearly as successful a text as we had hoped on the basis of the promise in the preface. I would not use the book again as a core text for a graduate class or seminar, unless the students already had experience in fitting nonlinear data to dynamic models. One difficulty with the chapters in the "Case Studies" section is that they are packed with the results of regression analyses, and it is not always clear what methods Turchin used or whether the data or the output from models are being fitted to polynomial surfaces. In particular, some results were obtained

through standard nonlinear regression techniques, while others were obtained through Turchin's own nonlinear time series modeling method, which is based on Box–Cox methods for fitting response surfaces. On the other hand, readers familiar with any of the case studies on the larch bud moth (chapter 9), the southern pine beetle (chapter 10), the red grouse (chapter 11), voles and other rodents (chapter 12), and the snowshoe hare (chapter 13) will surely be rewarded by Turchin's exquisite dissection of the best evidence to date about the endogenous ecological factors driving population processes in these species.

The case study on ungulates (chapter 14), however, is notably inferior to the others. The synthesis of ungulate models and data is dealt with in much more detail by Owen-Smith in his recent book, *Adaptive Herbivore Ecology* (2002). Further, although Turchin's chapter on trophic interactions is the most comprehensive review of its type, it does not discuss the class of metaphysiological models that underpin Owen-Smith's ungulate models. This is surprising, since this class of models deals directly with an issue raised by Turchin but then left unaddressed, namely, that "parameters of the logistic model combine individual-level parameters in subtle ways, and it is dangerous to modify them in a phenomenological fashion" (p. 62). (For more detailed discussion of this problem, see Ramos-Jiliberto [2002] and references therein.) Metaphysiological approaches also provide a natural way to build tritrophic models of the vole, lemming, snowshoe hare, and ungulate populations discussed by Turchin—models in which each of these species is simultaneously both a consumer of the vegetation below it and a resource for the predators above it. In concluding his chapter on ungulates, Turchin proposes "the 'generic mammalian herbivore model' (section 4.6) as an integrated framework for investigating cervid population dynamics" (p. 381). That other approaches are currently in vogue casts some doubt on Turchin's claim that population ecology really has the scientific maturity to adjudicate between modeling paradigms, at least in the area of ungu-

late dynamics. To my mind, even the heated debate over the functional response of consumers—whether this response should be resource-dependent or ratio-dependent—has not been satisfactorily resolved. Thus Turchin's criticism of Akcakaya's ratio-dependent approach (p. 350) may not be as decisive as he would have us believe.

This thought brings me to the nub of the book. Turchin poses the questions, "Is population ecology a mature science? Is it becoming a predictive science?" (p. 392) and concludes, "I believe that the answer is a resounding yes. In fact, my whole book can be taken as an extended answer to the this question" (p. 392). He certainly has taken a much more serious stab at answering this question than anyone else since Peters (1991) came to the opposite conclusion more than 12 years ago. It appears, however, that Turchin has been seduced into thinking that "population dynamics are underlaid by a set of foundational principles...which are analogous to laws in physics" (p. 393). Perhaps he overestimates the degree to which his models can reliably predict the future because his measures of model performance (set up in his equation 7.9) relate only to how well the next point in time is predicted rather than to prediction of some distant future time (an ability that is the hallmark of physical models). He appears to do so when, in a burst of exuberance on the penultimate page of his text, Turchin boldly states (in the context of modeling vole populations) that "there is no reason why a relatively simple oligofactorial model should be able to capture its dynamics. Yet it does" (p. 395). He invokes the ghost of physics envy past by adding parenthetically, "After writing this paragraph, I discovered that physicists have also been puzzled by the 'unreasonable effectiveness of mathematics in natural sciences.'"

If you are a population biologist who believes in the Holy Grail of a set of population laws, or if you are willing to forgive this quirk, then you should buy Turchin's book and read it. You will need to be tolerant of a nonstandard approach to defining the order of a process (as opposed to defining it as the order of a difference or differential equation used to model that process). You will also need to accept an *ad hoc* approach to defining quasi-chaotic systems and a misappropriation of the term "quasi-stationary distribution." (The latter has the well-defined meaning in stochastic process theory of a population distribution conditioned on not having entered an absorbing state such as extinction. Compare this with Turchin's use of the term to mean approximate stationarity over a finite interval of time.) Nonetheless, despite its faults, Turchin's book sets new standards in population ecology for monographs synthesizing theory and data. The book is, as Ilkka Hanski claims on its dust jacket, "a true landmark in the study of population ecology."

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References cited

Krebs CJ. 1995. Two paradigms of population regulation. Wildlife Research 22: 1–10.

Owen-Smith RN. 2002. Adaptive Herbivore Ecology: From Resources to Populations in Variable Environments. Cambridge (United Kingdom): Cambridge University Press.

Peters RH. 1991. A Critique of Ecology. Cambridge (United Kingdom): Cambridge University Press.

Ramos-Jiliberto R. 2002. Population-level consequences of antipredator behavior: A metaphysiological model based on the functional ecology of the leaf-eared mouse. Theoretical Population Biology 62: 63–80.

NONSOLUTIONS FOR NONECOLOGISTS

A Citizen's Guide to Ecology. Lawrence B. Slobodkin. Oxford University Press, Oxford, United Kingdom, 2003. 256 pp. $40.00 (ISBN 0195162862 cloth).

Larry Slobodkin is professor and chair of the Ecology and Evolution Department at the State University of New York at Stony Brook, one of the earliest departments of ecology in the United States. I looked forward to reading this book, as the title seemed to indicate that I was the target audience: a citizen interested in knowing more about ecology. As a social scientist who often works with ecologists on interdisciplinary projects, I hoped this book would be a great resource for learning more about ecological theory and principles.

After defining ecology and ecologists in a brief introduction, Slobodkin introduces readers to the "big picture" of how the natural world works, generally using ordinary language and examples, although occasionally a technical term like "benthic" slips in without definition (or glossary). He goes on to describe in some detail the ecology of lakes, claiming that "it is possible to gain a kind of understanding of all communities on earth by considering them all as more or less extreme variants of lakes" (p. 70). A brief discussion of ocean and dry land systems follows, after which Slobodkin moves on to describe how species survive, using everyday examples to explain and simplify the complexities of population biology (an appendix presents more technical details about the rate of increase of populations).

The final section of the book is devoted to policy and "applied ecology," with a focus on global warming and endangered species. Here Slobodkin shifts from a description of ecological phenomena to a more prescriptive discussion about "what can be done" and "how to protect." After presenting the bare bones of global warming, he urges the "world's

citizenry [to become] aware of it" and admonishes "each person [to modify] his or her behavior in relatively painless small ways" (p. 166). This superficial recommendation exposes the danger of simplifying complex natural and policy problems. The author claims that "most of the realistic actions that might be taken in confronting the problem are curiously undramatic. How I eat and dress, how I maintain and heat my house, how cities are designed, how governments...exert power, and how we interact to maintain international compliance with regulations all affect global warming" (p. 157). As a social scientist, I wonder how anyone could think that changing any one of these cultural, political, and economic institutions would be "curiously undramatic." It can make sense to ask individuals to change their behavior as a solution to large-scale problems only if you don't consider and understand how history, economics, and politics interact with the science of climate change or endangered species. The scale of change needed to modify climate change or protect endangered species makes it unlikely that painless modifications in individuals' behavior alone will accomplish the task. The author is not well versed in policy science, dispute resolution, or any social science, which is reflected in the brief discussions and careless recommendations in the last section of the book.

The goals of the book are ambitious. The author wants to present a solid body of ecological theory and evidence, as well as criticize some of the "dubious material that has appeared in the name of ecology," in a way that allows citizens (i.e., nonecologists) to tell the difference between "real problems and needless alarm" (p. 21). Unfortunately, this book was neither written for me, a reasonably well-educated citizen, nor written particularly well. The writing is a clumsy combination of scientific language, questionable analogies and side comments, and platitudes. Slobodkin says many times that he wants to explain ecological principles and applications in nonbiased and objective ways. For example, his claim that the book "will enable readers to distinguish serious ecology from mystical visions of nature provided by well-meaning pantheists as well as nonsense mouthed by self-appointed leaders for personal aggrandizement or from a desire to hear their own voices" (p. 20) lets me know what his prejudices are and presents a vivid image, but it does not give me confidence that he can be objective about those who don't agree with his message or his style. Despite the author's resolve to provide unbiased information, I often found myself sorting through gratuitously harsh and didactic comments, including one about the "nonsense" of Aldo Leopold's criteria for ecological damage. Maybe Slobodkin believes that objective language is reserved only for "scientific" topics.

The book concludes, "Will we continue to muddle through? I hope so." So does everyone, I imagine. But will readers learn anything about ecology that will help them to muddle? It is difficult for me to assess the reliability or credibility of the ecology described in this

book, primarily because of the uneven language. I had enough difficulty with some of the text that I asked colleagues who are ecologists to help explain some of Slobodkin's ideas and determine whether the claims made were reasonable. And although extensive footnotes are provided, I don't think a citizen reader should be expected to unearth PhD theses or obscure journal articles to check the veracity of the text. The author says that "ecology is in danger of becoming an uncomfortable blend of science and a passé but still trendy mass movement" (p. 13). I'm sorry to report that this book does little to remedy this description of ecology for the citizen reader.

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RETIRED AGRICULTURAL ECONOMIST SPEAKS OUT

Terrorism, Radicalism, and Populism in Agriculture. Luther Tweeten. Iowa State Press, a Blackwell Publishing Company, Ames, 2003. 176 pp., illus. $59.99 (ISBN 0813821584 cloth).

Luther Tweeten, a widely known and highly regarded agricultural economist, is professor emeritus of agricultural marketing, policy, and trade at the Department of Agricultural, Environmental, and Development Economics, Ohio State University. He is widely known not only for his excellent scholarly writings and views on the economics of agriculture in the United States but also for his outspoken conservative views of agricultural policy and of trade, environmental, and industrial issues. To quote Tweeten in his preface, "I am frequently asked by activists to joust because I so often lose." This shows in the book.

Tweeten started writing *Terrorism, Radicalism, and Populism in Agriculture* on September 11, 2001, hence the emphasis on terrorism in the title and elsewhere in the text (although he had been building on his themes before the September 11 attacks). The connection between terrorism and agriculture is carried throughout the book; I will examine later how Tweeten makes this connection.

This was a fascinating book to review. It ranges in content from personal revelations of how the author views his world to a boring but very informative (depending on one's interests) history of agricultural organizations. The book was published from a printed manuscript, and it shows. Its margins are small, white space is hard to find, and there are few illustrations. Given the density of the book and the way its information is presented, the price seems a bit steep; and I had trouble identifying its intended audience.

The book starts with a discussion of postmodernist philosophy and how it relates to radical agriculturists' view of the world. Essentially, Tweeten sees postmodernist philosophy as opposite to analytical philosophy, which is based on reason as expressed in science in the United States. In contrast, postmodernist philosophy originates from continental philosophy, which has its basis in subjective reason and emotion. This explains to Tweeten's satisfaction why terrorists, radicals, and populists behave the way they do. But, of course, the human psyche is not that simple, and most people use analytical and continental philosophy more or less interchangeably throughout their day.

Tweeten takes on antiglobalists—radical agriculturists who apparently think locally—in a chapter that defines and defends free trade (as opposed to fair trade) and multinational corporations. He describes the standard model of global economics, with its reliance on markets, privatization, and deregulation, and how it ensures broad-based development. This chapter gives a good overview of the worldview of most agricultural economists.

The next group Tweeten discusses are the radical environmentalists, who he claims "serially overstate and overdramatize environmental threats to food and agriculture." He uses Paul Ehrlich, Lester Brown, and Al Gore as examples of radical environmentalists. Other radical environmentalists, he argues, go even further by terrorizing people and destroying property. In this chapter, population trends, global warming, biodiversity, and soil erosion are discussed, as are water quality, hypoxia, and chemical contamination of food and water. Tweeten feels that radical environmentalists have caused costly overregulation; he cites the termination of the use of Alar and measures to counter global warming as two examples of such overregulation. The chapter includes a discussion on the sustainability of US and global agriculture, including food production. Organic agriculture also comes in for strong criticism: Tweeten uses the old saw of "saving land for wildlife" to decry organic production, arguing that organic production requires far more land for the same level of production as conventional farming.

Tweeten really gets going when he takes on the Luddites. He defines "Luddites" as those who use unethical means to stop technology, excluding from his definition reasonable people who criticize technological advances. But very quickly Luddites become identified with just about anyone who questions technologies (including biotechnology, to which Tweeten devotes several pages), supports international regulations, or defends family farms.

Animal rights activists are Tweeten's next target. He begins by offering an excellent and well-balanced treatise on the ethics of animal welfare. The association between agriculture and terrorism is clearer here than in other parts of the book: If there are "terrorists" in agriculture, they certainly include the shadow groups that release mink and other animals to die in the open. Tweeten could have left well enough alone, but his arguments lose some of their force and coherence when he takes on tangential issues, including vegetarianism, antibiotics, and concentrated animal feeding operations. Although generally supportive of the agricultural industry, he does admit that animal agriculture has lost its social ties to the rural community.

Agrarian populism and farm fundamentalism get their fair share of attention in the remainder of the book. "Populism" refers here to the thinking that offers appealing, simple, and straightforward solutions to complex problems—solutions that, according to Tweeten, often turn out to be wrong. His critical discussion on farm fundamentalism (the idea that farming is the basis of the US economy and heritage and must be preserved) is profound; it is also sure to agitate many who believe that agriculture is a way of life that must be protected and preserved. Tweeten postulates and explores 10 myths of farm fundamentalism, concluding that agricultural populism is another name for bad economics.

The last chapter gives an excellent historical view of farm organizations in the United States, including a great deal of information that few know (and even fewer care to know) about the evolution of farm organizations starting from about 1830. As a stand-alone chapter, this one ranks as the best in the book.

Tweeten concludes that the greatest danger posed by agricultural populists and radicals is that, to further their own political agendas, they perpetuate myths that generate animosity toward agribusiness. These groups, according to Tweeten, cost the nation and the world higher food prices, lower incomes (by curtailing international trade), greater environmental degradation, and more hunger. As a solution, he proposes reinvigorating the social contract between agriculture and government.

It is easy to be critical of the arguments in this book, especially if one falls into one of the broad categories of "bad actors" discussed by Tweeten (although this would put one in the company of such outstanding scholars as Neil Harl, Mike Duffy, and Bill Heffernan, to name a few). But to benefit from the arguments in the book, one must shake off the ingrained biases built up over years of debate and realize that this book gives a realistic assessment of today's conservative worldview. In the words of a long-forgotten TV show, the author shows his readers "my world—and welcome to it."

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NEW TITLES

The Beaver: Natural History of a Wetlands Engineer. Dietland Muller-Schwarze and Lixing Sun. Cornell University Press, Ithaca, NY, 2003. 192 pp., illus. $35.00 (ISBN 080144098X cloth).

Birds of the Salton Sea: Status, Biogeography, and Ecology. Michael A. Patten, Guy McCaskie, and Philip Unitt. University of California Press, Berkeley, 2003. 393 pp., illus. $65.00 (ISBN 0520235932 cloth).

A Brand New Bird: How Two Amateur Scientists Created the First Genetically Engineered Animal. Tim Birkhead. Basic Books, New York, 2003. 288 pp., illus. $26.00 (ISBN 0465006655 cloth).

Drafting a Conservation Blueprint: A Practitioner's Guide to Planning for Biodiversity. Craig R. Groves. Island Press, Washington, DC, 2003. 420 pp., illus. $35.00 (ISBN 1559639385 paper).

Missing Links: Evolutionary Concepts and Transitions through Time. Robert A. Martin. Jones and Bartlett Publishers, Sudbury, MA, 2003. 303 pp., illus. $34.95 (ISBN 0763721964 paper).

A New Island Biogeography of the Sea of Cortes. Ted J. Case, Martin L. Cody, and Exequiel Ezcurra, eds. Oxford University Press, New York, 2003. 669 pp., illus. $95.00 (ISBN 0195133463 cloth).

Sperm Whales: Social Evolution in the Ocean. Hal Whitehead. University of Chicago Press, 2003. 456 pp., illus. $30.00 (ISBN 0226895181 paper).