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Economics as a life science: Review of You Can't Eat GNP: Economics As If Ecology Mattered by Eric A. Davidson and The Nature of Economies by Jane Jacobs

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Economics As a Life Science

You Can't Eat GNP: Economics As If Ecology Mattered. Eric A. Davidson. Perseus Publishing, Cambridge (MA), 2000. 247 pp. $23 (ISBN 0–7382–0276–2 cloth).

The Nature of Economies. Jane Jacobs. Modern Library, New York, 2000. 190 pp. $21.95 (ISBN 0–679–60340–9 cloth).

Both ecology and economics share the same Greek root, *oikos*, meaning "house." Linked with *nomics*, it means "management of the house." Linked with *logy*, it means "study or knowledge of the house." Obviously, study and knowledge should go hand in hand with management, and good ecology should be a basic ingredient in good economics. Unfortunately, in the recent past ideas about management of our world as encoded in conventional economic theory, in biologist E. O. Wilson's words, "can be summarized in two labels: Newtonian and hermetic. Newtonian, because economic theorists aspire to find simple, general laws that cover all possible economic arrangements...hermetic—that is, sealed off from the complexities of human behavior and the constraints imposed by the environment" (Wilson 1998, p. 197).

Two recent books are notable in the growing body of work that attempts to break the hermetic seal and reconnect economics with the real world. They are notable not so much for the novelty of the basic ideas they espouse—ideas that have been percolating in academic circles for at least several decades (Boulding 1966, Daly 1968, Costanza 1991, Costanza et al. 1997a, 1997b)—but rather for the eloquence and style with which they put the ideas across. Both books are eminently accessible and a joy to read, and therefore hold the prospect of reaching a much broader audience, both inside academia and out. Reaching this broader audience is essential in order to break the hermetic seal, because it is going to take a lot of pressure from the outside to get the lid to start turning—there is very little pressure from the inside for change.

Eric Davidson's book is a readable summary of many of the main ideas of ecological economics. He begins by describing three basic fallacies of the mainstream economic model. The first he calls the "Marie Antoinette" fallacy.

The mainstream model assumes near-perfect substitutability between land (natural resources), labor, and capital. If we deplete all our natural resources, the mainstream model says that we can simply substitute more labor or capital—or, as Marie Antoinette reportedly said when the French peasants were complaining about not having any bread, "Well, let them eat cake!" The truth is that manufactured capital, human capital, social capital, and natural capital function more like complements than substitutes (Costanza and Daly 1992), and a sustainable economic system requires a safe minimum of each of these four types of capital.

The second fallacy Davidson calls "Custer's folly"—the assumption that the technological cavalry will come over the hill to save us from ecological disaster just in time. The problem is that while technology might come up with solutions, it is foolhardy to assume that it

will, especially when the stakes are so high. It is much more rational to assume that technology will *not* come to the rescue at the last minute and to take a more precautionary approach that assures our sustainability regardless of technological developments (Costanza et al. 2000).

The third fallacy is "false complacency from partial success": If we can solve some environmental problems, we can, by extension, solve all environmental problems. Davidson likens this line of argument to a claim by a spouse abuser that he is a good person because he no longer beats his spouse as much as he used to. The truth is that many environmental problems that have appeared to be solved have actually just been moved to other regions or countries or social groups, often as a consequence of more open trade (Arrow et al. 1995). Also, in the crowded world in which we live, many new technologies have unintended consequences that may completely undermine and outweigh their initial, positive effects (e.g., DDT, chlorofluorocarbons).

Jane Jacobs' book is very different in style and deals with more fundamental issues concerning how economies work. It is written as a Socratic dialogue among a group of friends. This format allows for a very engaging and insightful treatment of some fairly complex topics, but at the same time it makes it difficult to place the dialogue in the rich academic literature on these topics. Jacobs focuses her effort in this dialogue on the basic functioning of economic systems, and the fundamental observation that they must obey the same laws of physics, chemistry, and evolutionary biology as any other complex adaptive system.

Jacobs is most famous for her work demolishing the doctrinaire views of city planners and forcing them to look at the way real cities really work (Jacobs 1961). In this book she does the same thing to economists, forcing the confrontation of unquestioned theory with reality. She also emphasizes some important philosophical positions that distinguish conventional from a more "ecological" economics.

The most basic of these positions is the idea that humans and their artifacts are just as much a part of nature as any other organism. The Cartesian dualism that underlies conventional economics (and much of conventional science) assumes that humans are somehow fundamentally different from the rest of nature. This sets up a basic (and false) environment vs. economy dichotomy and leads to a host of other conceptual difficulties. The truth is that humans and their artifacts behave much like all other complex adaptive systems. The book is a treatise on how complex adaptive economic systems (especially urban systems) work and the kind of science and policy that flow from this understanding.

Both of these books are must-reads for anyone concerned with how economies really function. They are also excellent starter volumes for those just getting interested in this subject. It is to be hoped that this latter category of readers will be large and will help to break the hermetic seal isolating economics from the real world and force it to become the life science it desperately needs to be.

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FUNCTIONAL AND EVOLUTIONARY BIOLOGY OF INSECT FLIGHT

The Biomechanics of Insect Flight: Form, Function, Evolution. Robert Dudley. Princeton University Press, Princeton (NJ), 2000. 476 pp. $49.50 (ISBN 0–691–04430–9 cloth).

During the past several decades, the study of insect flight and other topics in invertebrate locomotion has been dominated by detailed mechanical analyses in a few model systems. This engineering focus has led to major advances in our understanding of the aerodynamic mechanisms and power requirements for flight; it has also largely ignored the astonishing diversity of insect flight and the evolutionary processes that generated it. This is in curious contrast to the many studies of vertebrate form and function in which mechanical and evolutionary perspectives have been usefully integrated. In his important new book, *The Biomechanics of Insect Flight*, Robert Dudley, et al. goes beyond the standard engineering perspective to explore the diversity and biology of insect flight from morphological, functional, and evolutionary perspectives.

The opening chapter, "Flight and the Pterygote Insecta," focuses on flight and insect diversity, and makes clear that the book is not simply about biomechanics in its narrow sense, as the analysis of organisms as mechanical devices. Dudley is largely successful in providing a thorough, almost encyclopedic, overview of the functional biology of flight in all its manifestations: functional anatomy, kinematics and aerodynamics, physiology and energetics, sensory biology, and ecological and evolutionary contexts. There is an excellent balance and consistency in how these diverse topics are reviewed,