by raising the chief problem of the outer planetary systems as they appear to us: the repeated appearance of short dynamical time scales. Their context is that of the reaction of dissipation of perturbations by satellites back on the satellites themselves. It may be that several satisfactory resolutions of this problem will appear and that we need not be diverted into generation of scenarios for holocausts *à la* Nemesis.

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Adaptation in Sticklebacks

A Functional Biology of Sticklebacks. R. J. Wootton. University of California Press, Berkeley, 1985. xiv, 265 pp., illus. $29.75. Functional Biology Series.

This is the second volume of a series intended to explain how organisms "make a living." The stickleback fishes, especially the three-spined stickleback (*Gasterosteus aculeatus*), are particularly appropriate for this purpose because their biology has been studied thoroughly from diverse perspectives. In chapter 1 Wootton argues that theory can illuminate one's understanding of an animal's daily activity and that important theoretical insights can be gained by focusing on a single, well-studied species. Aspects of genetics, morphology, behavior, and physiology and their influences on growth, reproduction, distribution, and mortality are taken up in the next nine chapters. The final chapter attempts to relate some of this information to life history theory. This book is greatly updated compared to Wootton's previous encyclopedic work, *The Biology of the Sticklebacks*, but has a narrow focus on information needed to use sticklebacks in addressing theoretical problems of ecology and evolution.

This book nicely summarizes a vast and diverse literature on the ecology, evolution, and organismal biology of sticklebacks and identifies numerous areas in which research would be particularly rewarding. Although this synthesis is generally successful, Wootton occasionally has neglected some very important studies. Most of the chapters open with brief conceptual introductions. Theoretical issues and similar critical or well-studied cases in other animals are treated at appropriate points, but this development is uneven. Sections on growth and reproductive effort, topics in which Wootton has made original contributions, appear to be well developed; but the treatment of some other areas, systematics, morphology, and ecological genetics for example, is weaker. Some information is not traceable by citation to the original papers, and Wootton sometimes cites his earlier book rather than the primary literature. The closing chapter on theory of life history evolution is disappointing. Although the theory is suited to account for interpopulation differences, Wootton focuses on species-specific properties. Thus, no critical insights emerge. In addition, other theoretical issues concerning which stickleback biology could make fundamental contributions are neglected. The theory of clines, the maintenance of genetic diversity, speciation, the evolution of behavior (treated only in the context of parental investment), rates of evolution, and the adaptationist program beg for development.

Despite these criticisms, which admittedly reflect my own interests, this is a very readable book and an exceedingly useful and compact source of information on the ecology and evolution of a group that has the potential to provide major theoretical insights.

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Reprints of Books Previously Reviewed

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A Slot Machine, a Broken Test Tube. An Autobiography. S. E. Luria. Harper and Row, New York, 1985. Harper Colophon Books. *Reviewed* **225**, 46 (1984).

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Craniofacial Mesenchyme in Morphogenesis and Malformation. Kenneth S. Brown *et al.*, Eds. Liss, New York, 1984. xviii, 146 pp., illus. $44. Birth Defects: Original Article Series, vol. 20, No. 3. From a symposium, Seattle, June 1983.

Culture, Feeding and Diseases of Commercial Flatfish Species. E. W. Liewes. Balkema, Rotterdam, 1984. viii, 104 pp., illus. $18.50.

DNA Repair. Errol C. Friedberg. Freeman, New York, 1984. x, 614 pp., illus. $39.95.

Ecology. The Experimental Analysis of Distribution and Abundance. Charles J. Krebs. 3rd ed. Harper and Row, New York, 1984. xvi, 793 pp., illus. $33.50.

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