

From the June issue of *The Quarterly Review of Biology*, 2008.

Evolution

By Nicholas H. Barton, Derek E. G. Briggs, Jonathan A. Eisen, David Goldstein, and Nipam H. Patel. Cold Spring Harbor (New York): Cold Spring Harbor Laboratory Press. \$100.00. xiv + 833 p.; ill.; index. 978-0-87969-684-9. 2007.

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Overall, I find this the best undergraduate textbook on modern evolutionary biology currently available because it achieves an excellent integration of classical approaches to the study of evolution with the techniques of modern molecular genetics that have transformed it, namely the use of genetic sequences, genetic markers, and genetic manipulation. The writing is consistently clear, the figures and their captions mesh very well and are pedagogically effective, and the topics covered include essentially every area of evolutionary biology being advanced by molecular genetic techniques.

Most importantly, the discussion and explanations move fluidly between different levels of biological organization. For example, a chapter on conflict and cooperation begins with a general discussion of social evolution, then moves on to independently replicating genetic elements within genomes, “selfish” and “junk” DNA in eukaryotic genomes, the evolution of altruism by kin selection, parent offspring conflict, Sewall Wright's “shifting balance theory” of deme evolution, the relative strengths of individual and group selection, the evolution of stable cooperation in social groups by reciprocity and policing and, finally, the possible role of conflict and cooperation in the early evolution of self-replicating molecular aggregates. It is gratifying to see selection theory so well extended, connected, and tested in a single chapter—from the levels of genes and molecular aggregates to those of social groups, population demes, and species. And this is typical of most of the other chapters in the book.

This volume will surely be useful in providing background information for the discussion of many individual topics in graduate or advanced undergraduate seminars in evolutionary biology.