



## Genetics, Paleontology and Macroevolution

by Kevin Peterson

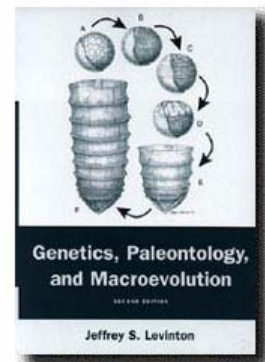
by Jeffrey S. Levinton (2nd edition)  
Cambridge University Press, Cambridge, 2001, 634 p.  
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ISBN: 0-521-80317-9. \$55.00 (paper)

Levinton's second edition of his **Genetics, Paleontology and Macroevolution** is an admirably updated and revised edition of his 1988 book. When published it received wide acclaim for its stalwart defense of neo-Darwinism (see, for example, Larson, **Science** 241:476; Hallam, **Nature** 334:206), and the second edition continues in this same vein.

As described by Levinton in the preface to the second edition, there are three new or expanded topics in particular: phylogenetics, evolutionary developmental biology, and a new chapter on the Cambrian explosion. Curiously, it was these three areas that I found to be the weakest parts of the book, although I want to emphasize at the outset that to distill the available information on any of these topics and present it in a relatively brief and cohesive manner is no small task, and Levinton does an adequate job. The rapid pace of these fields is intimidating, but I still found myself wishing I was reading Davidson (2001) or Carroll et al. (2001) for the evo-devo stuff. The new chapter on the Cambrian explosion brings together much of the relevant information, but his conclusions depend on the somewhat dubious result of Wray et al. (1996)

whereby bilaterians extend back to just over a billion years ago. This creates the uncomfortable situation whereby we are missing about 500 million years of bilaterian evolution in the rock record, and Levinton goes to

great pains to try and explain this conundrum. However, work in my own laboratory suggests that this molecular clock estimate is wildly inaccurate, and the Cambrian explosion is real (i.e., bilaterians evolved near the base of the Cambrian). With respect to stabilization of form, one of Levinton's primary theses, there is evidence for the (relatively) sudden appearance of body plans. However, since Levinton really does not incorporate any notion of stem and crown groups, an unfortunate omission given its power to explain both the rapid appearance of total-groups and the gradual evolution of the modern body plan (crown groups), he is left trying to explain a paradox that most likely does not exist.



My biggest complaint is that I really wanted to read this book from cover to cover, a few pages at a time each night, but I found it a difficult task. It couldn't hold my interest, despite the fact that I work on several areas covered in this book. I think the problem is that Levinton's primary message gets lost in this new edition with the addition of so much new material. I would recommend reading the first edition for the message, and using the second edition as a reference text. Despite this complaint, for me this is still the best mac-

roevolution book out there, but like most books of this scope, it serves as an introduction to a field rather than the final word.

#### REFERENCES

- Carroll, S.B., Grenier, J.K., and Weatherbee, S.D. (2001). **From DNA to Diversity: Molecular Genetics and the Evolution of Animal Design**. Blackwell Science, Malden.
- Davidson, E.H. (2001). **Genomic Regulatory Systems: Development and Evolution**. Academic Press, San Diego.
- Wray, G.A., Levinton, J.S., and Shapiro, L.H. (1996). Molecular evidence for deep Precambrian divergences among metazoan phyla. **Science** 274, 568-573.