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Book Review

The Paleontological Legacy of Eckert and Mauchly

Numerical Palaeobiology: Computer-Based Modelling and Analysis of Fossils and Their Distributions. David A. T. Harper, editor. John Wiley and Sons, Chichester, England. 1999. 468 pages. Cloth $99.00.

In 1982, my family became the first on the block to own a computer. We purchased an Apple IIe with double the standard amount of RAM (bringing it up to a whopping 128K), a 5¼-inch low-density disk drive, and an Epson ProWriter dot matrix printer. While I did spend quite a bit of time with this machine, I didn't realize the significance of this event until much later. It made me a member of the first generation of scientists who never knew an academic world that was not fully infused with computers. As part of this group, I was initially somewhat puzzled by the organizing theme of a book edited by David A. T. Harper called *Numerical Palaeobiology: Computer-Based Modelling and Analysis of Fossils and their Distributions.* All of the chapters in this volume review the use of computers in different areas of paleobiological research, and it seemed curious to link such diverse topics just because they use the same ubiquitous tool. One reason for the wide range of topics in such a volume is that computers are universal machines without a specific purpose. They don't really ''do'' anything in particular except shuffle bits of information, making mathematical operations and data handling easier than they would be without computers.

As for most people, much of what paleontologists do with computers is mundane and rather uninteresting. We type manuscripts, we create figures, we send and receive e-mail. Dispensing with these sorts of applications, Harper presents an eclectic collection of papers on topics covering computer-based analyses of fossils, from individual specimens to the entire fossil biota. I was generally pleased with the individual chapters but was somewhat disappointed with the lack of discussion of the status of ''numerical paleobiology'' in general.

The volume begins with a brief preface from the editor that covers a short history of computer use in geology and paleontology, a phrase or two about each chapter, and acknowledgments. The chapters follow a similar format, with each including some background information, an introduction to the paleobiological question(s) to be answered along with the basic methods to answer them, a list of relevant computer software, a case study, and a lengthy bibliography. Although the volume isn't explicitly organized in this way, I have grouped the chapters by similarities in theme and/or method of analysis.

Blood and Water Have Equal Viscosity

The first two chapters discuss relationships among organisms and species in both nonphylogenetic (Chapter 1, Quantitative and Morphometric Methods in Taxonomy, D. A. T. Harper and A. W. Owen) and phylogenetic (Chapter 1, and Chapter 2, Phylogenetic Systematics and Palaeontology, S. J. Carlson) contexts. Happily, Harper and Owen do not dwell on the historical conflict between phenetics and cladistics as methods of phylogenetic analysis, but rather, they note that phenetics has been used for taxonomy (numerical taxonomy) and continue on to show how it is applied in other areas of paleobiology. This chapter also includes brief discussions of morphospace, disparity, and stratophenetics, each of which uses phenetic analysis (or at least phenetic thinking) in one way or another. Carlson includes an overview of the methods and terminology used in phylogenetic systematics as well as areas of debate in the field. Her chapter is refreshingly broad in its coverage of the logic behind the method, and yet it is also quite detailed in the discussion of issues particular to paleontology. Carlson covers homology, character polarity, generation of character lists, and coding character states,

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