

Book Reviews

COLBERT'S EVOLUTION OF THE VERTEBRATES: A HISTORY OF THE BACKBONED ANIMALS THROUGH TIME, FIFTH EDITION. By Edwin H. Colbert, Michael Morales, and Eli C. Minkoff. New York: Wiley-Liss, Inc. 2001. 576 pp. ISBN 0-471-38461-5. \$145.00 (cloth).

The first edition of Colbert's *Evolution of the Vertebrates* was published in 1955 and evolved through several editions, culminating in the fifth. Colbert died in November 2001, ending an incredibly productive and prolific career. He is perhaps best known for his work on dinosaurs, but his *Evolution of the Vertebrates* is an often-used text for introductory vertebrate paleontology courses.

Much has changed during the 46 years between the first and fifth editions, such as the theory of plate tectonics and the discovery of Triassic African-like reptile fossils on Antarctica (these made it into the third edition in 1980). As our understanding of vertebrate evolution grew with many new discoveries, the book also grew from 30 to 32 chapters and 476 to 560 pages. But the overall structure remained the same, with each chapter dedicated to a major group, examples of specific animals within each chapter, and attempts to tie the different lineages together as they would have actually evolved through time. This approach makes the book quite readable, and maintains a flow of logic not inherent to all such introductory texts. The text is augmented with beautiful line drawings, but unfortunately no photographs.

The authors explicitly state in the preface that this is an introductory textbook on vertebrate evolution as known from the fossil record, and not a review of evolutionary theory or the specifics of any one taxon. Despite this caveat, there is still room for some improvement. This edition reads as if it was published quite a few years ago, in both the description of theory and presentation of facts.

On the theory side, the systematics section is rather slim. Paleontologists who advocate the use of cladistics will be disappointed by the three-sentence description of the method, no mention of shared derived versus shared primitive traits, and the scarcity of cladograms throughout. More specific to certain taxa, the origin of limbs is presented as selec-

tion acting on a fish needing to move more efficiently on land. But discoveries of *Acanthostega* specimens and analyses over the last 10 years demonstrate that early tetrapods were fully aquatic. Limbs first evolved for use in the water and were later co-opted for use on land. As for the origin of primates, only the arboreal hypothesis is mentioned as a possible explanation. Neither Cartmill's visual predation hypothesis nor Sussman's angiosperm hypothesis is introduced, though either of these is more likely than the arboreal hypothesis.

Additionally, it is difficult to understand why at least some insights from genetics are not presented. In the discussion of the tribosphenic molar pattern, the authors merely write that "details of the Cope-Osborn theory have been disproved by late twentieth-century findings" (p. 310). This is quite an oversight of the advances made in our understanding of the evolution of dental patterning through studies that combine genetic and paleontological data. Furthermore, no mention is made of the origins and evolution of the vertebrate limb and differential Hox gene expression patterns.

Aside from these theoretical omissions (that may have resulted from a concern for space), the authors neglect to incorporate some new critical paleontological discoveries. Here are two examples just from within primates. First, there is no mention of the new family Eosimiidae, the most basal member of the anthropoid radiation first discovered about 10 years ago in China. And second, the authors indicated that the best known early cercopithecoid is *Mesopithecus*, with no mention of the spectacular *Victoriapithecus* collections discovered and described over the last 15 years.

But all in all, a good general text on vertebrate evolution is a valuable addition to any library, and this one is no exception. As a basic reference, it is a nice place to start, but I advise any reader to be wary of how dated the information may be.

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BIostatistical Methods in Epidemiology. By Stephen C. Newman. New York: John Wiley and Sons, Inc. 2001. 382 pp. ISBN 0-471-36914-4. \$44.95 (cloth).

Epidemiology resembles accounting, or at least it used to back in the days when accounting was reckoned to be a discipline in which things added

up. Classical epidemiology has for decades relied on rates calculated by summing numbers of disease cases over age, sex, and exposure categories, and dividing by numbers of people at risk, or by the total time those people were at risk.

In the past few decades, readily available computer software has allowed epidemiologists, like others who work with numbers, access to a wide variety of sophisticated methods for analyzing data. Many epidemiologists, however, cling to the old ways. Those who do will find much to admire in Stephen Newman's *Biostatistical Methods in Epidemiology* a calm, thorough, and careful tour of the vast majority of nonregression methods popular among epidemiologists. Newman concentrates on the fundamentals of epidemiologic analysis, he says, because "most of what there is to learn from epidemiologic data can usually be uncovered using non-regression techniques." Implicit too in his approach is the conviction that viewing tabulated data prior to performing multivariate analysis can help an investigator identify important trends and patterns, as well as potential problems with data that could complicate or invalidate a model that assumes, say, multivariate normality.

The book is designed both as a textbook for students with a modest statistical background, and as a reference for researchers. The chapters are laid out sensibly from a teaching standpoint, beginning with introductory material on probability, sampling, and estimation, a lengthy chapter on issues of measurement and bias (including an extensive discussion of confounding from both a theoretical and a practical point of view), and a quick tour of the binomial distribution. The heart of the book focuses on methods for comparing differences in disease rates between groups in various study designs. It is emblematic of the author's systematic approach that odds ratio, rate ratio, and rate difference methods are addressed in separate chapters; despite their similarity from both theoretical and computational points of view. Whether or not students will appreciate the simplicity of presentation in light of some repetition is an open question; certainly those of us reaching for a reference will find it easy to navigate this format.

Chapters on survival analysis, case-control studies, standardized rates, life tables, sample size and power, and logistic and Cox regression methods close out the main text, followed by an extensive set of appendices containing proofs or arguments related to the material in various chapters. The thoroughness of Newman's approach is clearly documented in the appendices, which are

not the sort of thing that appear in most introductory textbooks.

It seems unlikely that practicing researchers in the field of physical anthropology will find answers to all, or even most, of their biostatistical questions in *Biostatistical Methods in Epidemiology*, given the book's strong emphasis on nonregression methods for discrete data analysis. Physical anthropologists are more likely to consult particular chapters meeting a specialized need, such as the detailed discussions of survival analysis and life table analysis. Those looking for a readily interpretable and well-behaved measure of effect for contingency table analysis would do well to read Newman's discussion of the underappreciated (outside of epidemiology) odds ratio and its extensions to the analysis of stratified data.

Almost anyone working with quantitative methods can find something at least heuristically useful in Newman's lengthy and well-illustrated discussion of the effects of confounding. On the other hand, few people outside the field of epidemiology are likely to warm up to the "counterfactual" approach to the control of confounding advocated by Newman, since controlling confounding along counterfactual principles requires either specialized study designs or prior knowledge of the relationship of confounding factors to the outcome under study.

In sum, *Biostatistical Methods in Epidemiology* is an excellent introduction to applied epidemiologic methods for motivated students or professionals who find themselves confronted with disease incidence or event history data, or with the analysis of stratified contingency tables. It will also serve as a useful reference for those already engaged in epidemiologic studies, even those, like the reviewer, who tend to think of everything as a regression problem. It will not satisfy those looking for a detailed discussion of logistic regression, log-linear modeling, proportional hazards or other survival regression methods, random effects models, or any technique whose name starts with the word "generalized." Of course, there are many books that do cover such methods, but few cover their subject matter with the degree of care Newman does.

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BOOKS RECEIVED

- Barham L, and Robson-Brown K (eds.) (2001) *Human Roots: African and Asia in the Middle Pleistocene*. Bristol, UK: Western Academic & Specialist Press, Limited. 263 pp. £35.00 (cloth).
- Boesch C, Hohmann G, and Marchant LF (eds.) (2002) *Behavioral Diversity in Chimpanzees and Bonobos*. New York: Cambridge University Press. 285 pp. \$33.00 (cloth).
- Komlos J, and Cuff T (eds.) (1998) *Classics in Anthropometric History*. St. Katharinen, Germany: Scripta Mercaturae Verlag. 629 pp. €60.30 (paper).
- Kruuk H (2002) *Hunter and Hunted: Relationships between Carnivores and People*. New York: Cambridge University Press. 246 pp. \$24.00 (cloth).
- Petersen J (2002) *Sexual Revolutions: Gender and Labor at the Dawn of Agriculture*. Walnut Creek, CA: Altamira Press. 178 pp. \$26.95 (paper).