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Phylogenetic Analysis of Morphological Data (review)

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Ireland and what they can tell us about population history. The interesting chapter by L. Leidy Sievert describes the growth and health of boys in an elite New England middle school from 1935 to 1960 based on records kept by the resident physician.

As this book makes clear, archival research can make an important contribution to human biology. It affords us the opportunity to study historical populations and thus expands our knowledge of the range of human biology. At the same time, most of the chapters in this volume focus on populations of European ancestry. For this reason, much more archival work remains to be done with non-European populations. However, for me, it was valuable to gain some understanding of demographic, health, and social conditions of “my” population at an earlier time. The experience was made richer by the fact that most of the chapters in the volume nicely situated the populations being studied in a historical context and examined the importance of political and social factors in shaping their biology. This attention to context reinforces one of the editors’ stated purposes of the book, which is to consider the place of archival research within physical anthropology theory and method.

In addition to emphasizing the fascinating insights that can be gained from archival data, *Human Biologists in the Archives* also makes clear some of the limitations. Only rarely do researchers using archival data have the luxury of drawing on evidence that was originally collected for research purposes. As a result, they must deal with situations where information on some of the variables of interest was not recorded, or recorded only sporadically, with no explanation of why some variables were recorded at one time but not at another. To some degree, this means that research questions must be determined by the available data, although Sattenspiel illustrates one approach that allows researchers to go beyond the available data.

Human Biologists in the Archives will be of obvious importance to anyone doing or planning on doing research on human biology using archival material. Because the chapters cover a range of topics, it could also serve as a reader for a graduate course focusing on health issues. Most of the chapters would also be suitable as supplementary readings in an upper-level undergraduate course. I thoroughly enjoyed reading this book and recommend it highly.

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Phylogenetic Analysis of Morphological Data, edited by John J. Wiens. Smithsonian Series in Comparative Evolutionary Biology. Washington, DC: Smithsonian Institution Press, 2000. 220 pp. (ISBN 1-56098-816-9). \$49.95 (hardcover), \$26.95 (paperback).

A naïve observer embarking on a survey of current systematic literature could be forgiven for assuming that modern phylogenetic techniques were intended primarily for use with molecular data. Abundant and easily obtained molecular characters constitute the data of choice for the majority of recent analyses. In addition, where molecules and morphology collide—as in the exploration of modern human origins—molecular analyses are often prioritized by both the scientific and the popular press.

Although some investigators have questioned the utility of morphology in reconstructing human evolution (Collard and Wood 2000), it is still the case that, ancient DNA analyses notwithstanding, molecular data are simply not available for inquiries into human evolution that involve the relationships of extinct taxa. The importance of caution and critical evaluation when selecting and analyzing morphological characters is a topic of some discussion in the paleoanthropological literature (Lieberman 1995; Strait 2001). *Phylogenetic Analysis of Morphological Data*, edited by John J. Wiens, provides a valuable resource for human systematists who are concerned with appropriate phylogenetic treatment of the traditional metric and nonmetric osteological characters that form the greatest part of the paleoanthropological database, as well as with other types of hard evidence.

Phylogenetic Analysis of Morphological Data, a slender volume of eight review chapters, derives from a similarly titled 1996 symposium held at the annual meeting of the Society for Systematic Biologists. These chapters constitute an important overview of theoretical problems and methodological advances in morphological phylogenetics, and their authors, who hail from a wide range of disciplines, are some of the leading scientists in the field. Unlike other books in the related literature (Hall 2001; Hillis et al. 1996), Wiens's book is not, for the most part, a how-to manual, and most of the discussions are heavily theoretical in nature. As a group of papers originally addressed to a specialist audience, most assume that the reader is a practicing systematist, already familiar with modern techniques of phylogenetic analysis. Nor is this collection a textbook, and, as noted in the preface, some topics (such as character selection and definition) are addressed in greater depth than others (such as character independence and ordering). But, because of the scope of the papers and the convenient chapter summaries, this book still provides a useful entrée to the field and to the literature, both for nonspecialists and for students. For specialists, *Phylogenetic Analysis of Morphological Data* constitutes a useful synthesis and summary of the current state of the field, as well as fodder for debate.

The rapidly evolving pace of molecular research can sometimes leave observers with the impression that the field of morphological systematics exists in a relative state of innovative stasis. This volume illustrates that this is not the case. The first chapter, by D.M. Hillis and J.J. Wiens, "Molecules versus Morphology in Systematics: Conflicts, Artifacts, and Misconceptions," sets the tone and tackles the strange but necessary task of defending the application of cladistic and related methods to the type of data for which they were originally intended,

concluding that the two types of data are complementary, not in competition with one another. Two other chapters written or cowritten by Wiens highlight the lack of methodological rigor and transparency regarding character selection and coding that are all too common in phylogenetic analyses of morphological data (and probably also in a large portion of the molecular literature) and offer logical, operational approaches for remedying these deficiencies. Whether or not the reader agrees with these critiques, they introduce a level of reflexivity that should be particularly welcomed by paleoanthropological systematists.

P.M. Mabee's discussion of ontogeny and interpretation of morphological characters may be more relevant to larger macroevolutionary questions regarding extant taxa for which development is better documented. But other contributions that may be of particular interest to students of human evolution address the discovery of characters in morphometric data, particularly those derived from partial warp analyses (M.L. Zelditch et al.) and the recognition and treatment of hybrids in phylogenetic analyses (L.A. McDade). Next, J.P. Huelsenbeck and B. Rannala discuss the unique contributions of fossil data; the methods discussed for incorporating stratigraphic information into phylogenetic analyses might be adapted for use with archeological data. Finally, K. de Queiroz contributes a highly relevant chapter about the use—necessity, really—of a phylogenetic approach to studies of character evolution and adaptation, an endeavor properly known as comparative biology but which has always, in its own way, been a central focus of human evolutionary studies. Tracing the histories of characters that are thought to be uniquely human cannot occur except in the context of a well-supported phylogeny, and de Queiroz discusses ways by which scientists can avoid inferential problems that would otherwise compromise the results of an analysis.

Readers looking for a bottom line or a consensus view will not find what they are looking for in this volume. This is not a criticism; these chapters reflect the maturity and vigor of the field of morphological systematics, a dynamic and innovative field, for all that it is currently overshadowed by a molecular vogue. *Phylogenetic Analysis of Morphological Data* is a particularly welcome contribution for human paleontologists and other scholars who use primarily morphological data in their efforts to reconstruct the evolutionary past. However, the quality of the theoretical discussions contained in this volume makes them a useful read for any researcher engaged in the process of constructing phylogenies.

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