

Book Reviews

Human Biologists in the Archives: Demography, Health, Nutrition and Genetics in Historical Populations. Edited by D. Anne Herring and Alan C. Swedlund. xvi and 341 pp. Cambridge: Cambridge University Press. 2003. \$90.00 (cloth).

This volume is based on papers read at a symposium held at Columbus Ohio in 1999 under the auspices of the Human Biology Association and the American Association for Human Biology. Its aim is to contribute to what the Foreword suggests “might signal a newly emerging area of biological anthropology, *human biohistory*: the historical reconstruction of the human biology of past populations” (p. xiii). The editors flag four main themes in their Introduction: population history, the biological consequences of institutional living, the impact of demographic and epidemiological crises, and what they term the “methodological and epistemological” implications of archival research.

The first of these themes is represented by studies of ecclesiastical vital registration data from a 19th century Costa Rican parish and a Franciscan Mission in southern California from 1772 to the 1890s, together with an analysis of anthropometric data from Ireland in the 1890s and 1930s. Institutional data come from an almshouse and an asylum in 19th century New York State and an expensive private school in post-war New England. Crises are represented by scarlet fever in the 19th century Connecticut valley, the 1865 Gibraltarian cholera outbreak, and the experience of the Baltic Aland islands during the Russo-Swedish War of 1808/09. The collection is rounded out by a study of female representation in a medieval skeletal population from York, nutritional and mortality trends in a 20th century indigenous community in central Canada (which would fit equally well under the “crisis” heading), and two survey articles—one on epidemiological modeling and the other an authoritative general review by Malcolm Smith of the role of archival work in Human Biology.

The collection is of high standard overall and each of the contributions contains something of interest, but taken as a whole they bear out the point made in the Foreword that

“archival demographic data are most valuable when they are applied to interesting problems.” This seemingly obvious observation is nonetheless important because work of this kind is often unavoidably “source driven.” The investigator may locate promising sources of data, but the information they contain and the analyses which they will bear reflect the interests and purposes of its compilers—sometimes long-dead—and the more or less random survival of documentary or other materials. This means that the specific problems open to investigation are frequently outside the investigator’s control, and a number of the contributions to this volume are of primarily methodological interest; their results demonstrate the validity of methods or materials (such as anthropometric data) through their compatibility with existing results or known historical circumstances.

In practice, as Malcolm Smith observes, the role of archival material is usually most valuable in deepening the time scale over which populations can be studied or allowing a detailed and dispassionate analysis of crisis conditions in a way that would rarely be possible for an observer on the spot. Mielke, for instance, shows how the Aland islands became a sort of natural laboratory in which the presence of large numbers of troops was sufficient in itself to trigger an epidemic crisis in the absence of either economic disruption or violence against civilians. Similarly, in their fine-grained study of cholera in Gibraltar, Sawchuk and Burke show how variations in access to water affected mortality but were themselves due to economic and social mechanisms too subtle to be detected in a simple analysis of physical facilities. Herring et al. consider a longer-term “crisis” in their grim but fascinating analysis of the ways in which the security and quality of indigenous Canadians’ diets was undermined by their incorporation into an international economic system as subsistence hunting gave way to fur-trapping within a cash economy. Infant and child mortality deteriorated substantially with declining nutritional status, even though the incidence of epidemic disease also fell.

JOHN LANDERS
All Souls College
University of Oxford
Oxford, United Kingdom
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The Backbone of History: Health and Nutrition in the Western Hemisphere. Edited by Richard H. Steckel and Jerome C. Rose. xx + 633 pp. New York: Cambridge University Press. 2002. \$75.00 (cloth).

With their impressive new volume, *The Backbone of History: Health and Nutrition in the Western Hemisphere*, historical economist Richard Steckel and physical anthropologist Jerome Rose seek to advance the new field they call macrobioarchaeology, which attempts to identify broad patterns of adaptation in the past across time and/or space by large-scale cross-cultural comparison of health and demographic data. The editors offer appropriate acknowledgment to *Paleopathology at the Origins of Agriculture* (Cohen and Armelagos, 1984) as the first major publication in macrobioarchaeology, but this more recent effort expands upon it in several ways, especially in sample diversity and the range of questions addressed. The most important original contribution, however, is the establishment of a numerical "health index" to allow direct comparison of health status among groups, and it is around analysis and application of this index that the lengthy volume is centered.

The book opens with a discussion of the development of the health index. Seven commonly evaluated skeletal indicators of nutrition, disease, and activity are scored in a standardized fashion with the results summed producing a value between zero and 100. The editors repeatedly remind us that at this point the index is "a work in progress that should not be overinterpreted" (p. 584). Indeed, areas for potential refinement are easy to recognize. For example, each health marker is similarly weighted, making arthritis and anemia equally important. Other markers do not have much gradation in value; thus, a broken finger equals a fatal blow to the head. The index becomes even more controversial when life expectancy is introduced into the equation, given the dubious view that many researchers already have toward paleodemography. Nevertheless, the health index is a worthy first effort at the creation of such a measure, and the few cases in which it is used to test hypotheses, such as the "osteological paradox" (Wood et al., 1992), and the association between ecological variables and health, demonstrate its potential value.

In the heart of the volume, the health index is compared among 65 populations organized into four large New World groups: Euro- and African-Americans, Prehispanic Mesoamerican, South American, and Native Americans in North America. The information, contained in 14 chapters, includes the archaeological context as well as a discussion of the various health markers for each skeletal series. With only minor exceptions these chapters are comprehensive, clearly written, thoughtful analyses. Although few strong trends are evident, some patterns do emerge both within individual populations and across all groups in the volume when the resultant health indices are compared. The most general, and the one most emphasized by the editors, is the substantial amount of health stress present in the New World before European contact. Even more, they argue that health had been in a gradual decline for several thousand years, a pattern driven by the fact that those living in more densely populated centers and those dependent on agriculture had more lesions related to nutrition and disease. These findings have been borne out in many previous bioarchaeological studies and thus will not be of surprise to anthropologists, but likely will be unexpected to many outside the discipline. Some unanticipated ratings were given, however, such as the fact that middle class 18th century whites did not bubble to the top of the index and that historic Plains Indian equestrian groups were among the healthiest individuals.

If the index is accepted, it creates a valuable new tool by which scholars in many fields, including history, economics, and historical sociology, can appreciate health patterns in the past. They must remember that the index without further refinement is at best good for seeing the large-scale picture, but not for any fine-tuned mathematical manipulations to detect subtle differences in nutrition and disease status. In contrast, some bioanthropologists will have strong reservations about ratings produced by the index. Even with refinement, the scoring standards for various health markers will continue to be challenged, such as the inevitable role of interobserver error in recording. Others will suggest that the index uses such broad parameters that the individual environmental and historical settings which the data are most reliably interpreted become largely lost. For example, as Johansson and

Owsley point out, some poor health can be the result of abuse of privilege rather than more limited access to resources, as would be most often presumed (p. 530).

Even if the validity of the health index is questioned, the volume still will be of great value. First, the data contained within the individual chapters will make it an instant classic among bioarchaeological reference sources. Second, many chapters contain comprehensive and up-to-date discussions of various issues in bioarchaeology, especially paleodemography. Finally, as researchers debate how the index might be refined and/or applied, *The Backbone of History* will undoubtedly be one of the most talked about books in the field in a long time.

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MARIE DANFORTH
*Department of Anthropology and
 Sociology*
*University of Southern
 Mississippi*
Hattiesburg, Mississippi
 DOI: 10.1002/ajhb.10206

The Delphic Boat: What Genomes Tell Us.
 By Antoine Danchin. 368 pp. Cambridge,
 MA: Harvard University Press. 2002.
 \$35.00 (cloth).

At first glance, one would think that any author who would attempt to synthesize apparently diverse elements of biology, genetics, computer software and firmware, medicine, and philosophy under one cover would be facing an impossible task. Not to mention that such an author would perhaps permanently confound practitioners of the Dewey Decimal System. In fact, Antoine Danchin's *The Delphic Boat* does begin to read like an amalgamation of disjointed essays bound up as chapters. Then, midway through, Danchin reveals his theme: This book is about information. More precisely, this book is about cognitive models of information. It is also about how information is transmitted; about

misinformation (or *dysinformation*, i.e., mutations); and about the coincidence of information in various systems.

The metaphor contained in the title reveals a portion (but only a portion) of Danchin's scaffolding. The Oracle at Delphi posed a question concerning a boat: If a wooden boat, over time, eventually consists only of new planks that have replaced the rotted and broken original planks, is the boat now the same boat? The answer, according to Danchin, is yes, if one defines "boat" as the relationship of the planks to the whole. Similarly, argues Danchin, genetic and biological systems, computer systems, and medical systems are more than the sum of their components, they are also—and more importantly—the relationships between those components.

On this cusp of the "age of '–omics,'" when many of the components of these various systems have been effectively described, it is now the task of researchers to attempt an understanding of the relationships between the components. The genes have now been (or are being) mapped by geneticists; their structural and functional relationships are the next task of the Human Genome Project (HGP), hence, genomics. Relationships and interactions among proteins are the goals of those who practice proteomics. And so on for transcriptomics, toxicogenomics, pharmacogenomics, etc.

This translated English version of *La barque de Delphes* (Editions Odile Jacob, 1998) has been reorganized into five chapters, plus a prologue and an epilogue. Readers should be prepared for significant descriptive and speculative fugues, in the sense that Danchin often attempts to carry forward several motifs simultaneously in the hope that the reader will discover their coincidence by a recursive process, the single thematic configuration algorithmically distilled from apparent chaos. The read itself is an exemplar of the distillation process that Danchin illuminates.

This is a challenging book: At several junctures this reviewer felt as if he were walking on the flotsam of Danchin's wrecked boat and being asked to pick up the pieces. Yes, the read requires significant effort, but is worth the view from the bridge of the final chapter, which bears no less a title than "What Is Life?" To which Danchin poses his hypothesis that living systems—organelles, cells, organs, organisms—act as

Turing machines; that is, a compartment into which a series of symbols enters, is recursively processed or algorithmically transformed (requiring energy), and then exits in a different state of either a higher (information) or lower energy (entropy). What the human mind arguably has in common with living systems is its intuitive ability to reflect this process, to make reality virtual, and to then implement that cognitive model as a concrete machine, a tool. Thus it can be argued that representations of biological systems can be stored in silico on a computer (one possible state of a Turing machine), and the potential functional relationships between states or objects (e.g., genes) can be manipulated to ever more closely simulate real biological systems (Médigue et al. 1991). According to Danchin, not only is the biological system algorithmic and recursive, but so is the mind's virtual model, and likewise the computer chip. Hence, the organization of Danchin's words bound between its two cloth membranes, as a paused system, waiting to be processed by a reader.

Readers of the *American Journal of Human Biology* will find much detail in this work that is specific to bacterial genomes (the author is a bacterial genomist), but removing the nonhuman introns is no more difficult than the mental editing of any full genetics textbook.

As an attempt to mirror the configurations or relationships of parts to wholes in larger systems, perhaps the term *gestalt* (not found in the book) is either too passé, or too bound to the literature of psychology to be used effectively in this new context. Likewise, *systems theory* itself may be too limiting a label to define Danchin's vision. These concepts nevertheless recur, even if not explicitly recognized by the author. In a work that parses nearly all the relevant terms and concepts, one wonders—if only for historical reasons—why these, too, were not reviewed.

Readers should also be prepared to encounter a few minor but distracting errors introduced by either translation or typesetting in the English edition: The codon AUG is represented by the DNA triplet *TAC* (not *ATG*, p. 86 in the reviewer's copy); and the ribonucleotides are *rA*, *rC*, *rG*, and *rU* (not *rT*, p. 333), for example. Overall, however, the rate of mutation is low and the translator, Alison Quayle, deserves high marks for reorganizing the original French text,

and for representing complex themes in approachable English.

The author is due high praise for this attempt at a synthesis of vastly disparate batches of information. This reviewer recommends the work to anyone with an interest in post-HGP genomics. Were this a polytene chromosome, one might have wished for fewer philosophical "puffs" and more straightforward explanation of the similes; but, on the other hand, what's a meta for?

Antoine Danchin is Professor and Head of the Unit of Genetics of Bacterial Genomes at the Pasteur Institute in Paris and Director of the HKU-Pasteur Center in Hong Kong.

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LARRY MAI
*Departments of Anthropology
 and Biological Sciences
 California State University
 Long Beach, California
 DOI: 10.1002/ajhb.10207*

Ecology of Aging. Human Ecology, Special Issue No. 8. By Anna Siniarska and Napoleon Wolanski. 215 pp. Delhi: Kamla-Raj Enterprises. 2000. \$55.00 (cloth).

In this volume aging is presented from an environmental perspective. The editors and co-authors represent over 40 years of research in Poland, the USA, the former Yugoslavia, and Mexico, and much of the rest of the world is represented by an international group of authors. The book is divided into three sections. The Introductory Section A is entitled Theory of Aging and begins with Chapter 1, an overview by the editors of the ontogenetic-development-ecological perspective. Chapter 2, by J.F. Shroots, presents age changes using gerodynamics, which posits that the "dynamics of living systems is represented in nonlinear series of transformations into higher and/or lower order structures or processes" (p. 25). J. Pariskova compares the healthiest old people to people who have shorter lives in terms of diet and exercise over the entire life span in Chapter 3.

Section B, Ecological Factors of Aging, begins with a discussion by A.T. Steegmann and S. Hewner in Chapter 4 of climatic stressors such as heat and cold and their interaction with poor living conditions and how these factors may accelerate the aging process. W. Stini reviews how age-related changes in body composition affect nutritional requirements in Chapter 5. R. Shephard examines the significance for aging of the ecological context of habitual physical activity and work capacity relative to the workplace in Chapters 6 and 7, respectively. U. Wittwer-Backofen looks at the influences on social stratification in human aging and the biological ramifications in Chapter 8, and S. Hewner details ethnic differences in the aging process in Chapter 9 and notes that poor definitions of age, race, or ethnicity make it difficult to assess the biosocial dynamics.

Section C, Environmental Factors in Aging of Structures and Functions, includes Chapter 10 only, by D. Karasik, E. Kobylansky, and G. Livshitz, in which is reviewed the extensive literature (160 publications) on the ethnic and familial factors affecting bone development and aging. The final Section D, Patterns of Studies on Ecology of Aging, concludes with Chapter 11 on the demographic factors relative to cultural and environmental context for the ever-increasing proportion of elderly worldwide, by A.G. Drusini, and Chapter 12 by the editors with an overview of the volume's themes and a description of Wolanski and colleagues' ongoing studies from 1958–1995 of participants age 30–80 years in the Whole Family Study.

There is much to ponder after reading this volume, and the editors invite international cooperation.

JOAN C. STEVENSON
Book Review Editor
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The Primate Fossil Record. Edited by Walter Carl Hartwig. xiv + 530 pp. New York: Cambridge University Press. 2002. \$175.00 (cloth).

Almost a quarter of a century ago, Fred Szalay and Eric Delson (1979) undertook a survey of what was then known about the

fossil record of primates. Since that time, the quality and quantity of the fossil record of primates has grown exponentially. There have been other books that have summarized this record more synthetically and in much less detail—Fleagle (1999), Martin (1990), and Conroy (1990), to name three—but until now nothing has rivaled Szalay and Delson in its comprehensiveness or detail. Indeed, we have reached the point where one individual or a couple of collaborators can no longer do justice to the richness of the record. Walter Hartwig has stepped forward with the next best thing—a carefully edited multiple-authored reference work of the highest caliber: *The Primate Fossil Record*. Here will be found species-level accounts of all the fossil primates known up to about 2 years ago. A fairly strict organizational plan is maintained. Chapters begin with a historical account of the recovery of the fossils and debates about their phylogenetic position or paleobiology. I particularly enjoyed the discussions by Godfrey and Jungers about subfossil lemurs in Chapter 7 and Beard about early anthropoids in Chapter 9.

Following the historical account, each chapter has a systematics section, presented as a Linnaean hierarchy, with an account of genera and species. An appealing aspect of these sections is that dry descriptions of anatomical detail are mostly eschewed in favor of illustrations. Some irregularities emerge here—some lists of genera are arranged alphabetically, others are organized by the date of description, and still others appear to be idiosyncratic. Authors have the option of including a section for “problematic taxa”—genera that have defied ready classification often because they are too poorly preserved; *Amphipithecus*, *Afrotarsius*, and *Pondaungia* find their way into such “grab-bags.” Indeed, they find their way into *several* of them in different chapters.

The organization of the systematics sections is not precisely cladistic. Hartwig states that he did this because he wished to avoid promotion of one interpretive phylogeny, or the means for deriving one, over another. Indeed, authors are all over the map on whether they accept a purely cladistic classificatory framework with its tenet that the systematic arrangements follow precisely a phylogenetic scheme. “Wastebaskets” abound for primitive taxa. As it happens, however, most (all?) of the authors

are committed to *thinking* in phylogenetic terms. They want to know the precise position of their taxa on a phylogenetic tree (the first one appears more than 150 pages into the text), even if they cannot make such judgments on the available evidence (and even if they have no inclination to use phylogenetic classification). Each chapter has a systematic table with family-level groups (some monophyletic and some paraphyletic). I would have preferred that this be accompanied, or even replaced, by a phylogenetic scenario showing the author's opinion about how the taxa are related to one another, where the major grade shifts occurred, and where the species fit in time and space.

Which brings me to the area I think is the least helpful part of this book: there is no general treatment of time or space. Land mammal ages, epochal designations, and absolute dates frequently are mentioned but they are buried within systematic accounts. One summary chapter about geologic time and land mammal ages and another about paleogeography, climate change, and primate species distributions through time would have been enormously helpful. The data are mostly embedded in the book but not exploited in this manner. This would have enabled students of primate evolution to get some handle on general trends in primate evolution.

Systematics sections are followed by comments about the evolution of each group. These sections are idiosyncratic, reflecting a blend of paleobiology, functional morphology, and phylogeny. This is as it should be. The authors of all sections are leading authorities and we want to know what they think is important about their groups and where the big questions are to be found.

In addition to the systematics-oriented chapters, there are several interesting topical chapters; for example, one on crown primate origins and many dealing with major

adaptive radiations. I particularly enjoyed those by Marian Dagosto and Tab Rasmussen, Chapters 8 and 14, respectively.

In addition to the absence of proper treatment of time and space, I find two other features disappointing. First, consideration of the value of genetics for establishing phylogeny, while discussed in a general way by Pilbeam, is entirely left up to the chapter writers—and is ignored by some. Second, I was surprised that the book does not include treatment of the Paleocene Plesiadapiformes. Perhaps the important descriptions of new carpolestid and paromyid material broke too late for inclusion, but signs now point strongly to the possibility that some or all Plesiadapiformes may be more closely related to primates than to any other living order of mammals. That makes them stem primates, even though they lacked the shared-derived features that are hallmarks of crown primates—"euprimates."

These minor criticisms aside, Walter Hartwig's book sits on my shelf next to the very best books about primate evolution. Its merits are many. Its deficits are few and entirely forgivable. *Qué Bueno!*

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RICHARD F. KAY
*Department of Biological Anthropology
 and Anatomy
 Duke University Medical Center
 Durham, North Carolina
 DOI: 10.1002/ajhb.10209*