

Book Reviews

Guns, Germs and Steel: The Fates of Human Societies. By Jared Diamond. 480 pp. New York: W.W. Norton & Co. 1997. \$27.50 (cloth).

Reading *Guns, Germs and Steel* as I traveled through Mexico this summer gave a new twist to the usual small talk. When a taxi driver in Monterrey explained that northern Mexico is wealthier than southern Mexico because people in the south are distracted by religious faith and fiestas, I thought, hmm, proximate causation. When I repeated his argument to a religiously observant friend in a northern city, my friend responded that it is easier to grow food in the south; hence the north developed (wealth-making) technology. Hmm, I wondered, is that the ultimate cause?

People create stories to explain inequalities. Jared Diamond does the same in his Pulitzer Prize-winning book, but on a global scale. Instead of wondering why the north differs from the south, Diamond wonders why the Spanish conquered Mexico. Why did the Aztecs not conquer Spain? Religion, technology, and government are proximate causes but, Diamond concludes, the patterns of world history are explained, ultimately, by plant and animal domestication or, more to the point, "differences in real estate" (p. 401).

As he has frequently demonstrated in *Discover* magazine and *Natural History*, Diamond is a superb organizer of information. The sweep of this book leads us from anthropology to geography, horticulture, zoology, the study of infectious disease, and the history of writing, technology, government, and religion, or "the main sets of proximate agents leading to history's broadest pattern" (p. 267). Throughout this book, Diamond uses his friendship with people of New Guinea to personalize his global undertaking, beginning with a local politician's question "Why is it that you white people developed so much cargo and brought it to New Guinea, but we black people had little cargo of our own?" (p. 14).

Diamond's question/answer format is both provocative and manipulative. For ex-

ample, Yali's question is immediately rephrased. First, "Why did wealth and power become distributed as they now are, rather in some other way?" (p. 15), and then "why did human development proceed at such different rates on different continents?" (p. 16). Finally, Diamond asks, "Why did New Guineans wind up technologically primitive, despite what I believe to be their superior intelligence?" (p. 22). One part of the answer is that although New Guinea has had "potential Edisons," "they directed their ingenuity toward technological problems appropriate to their situations, . . . rather than the problem of inventing phonographs" (p. 264).

Simply stated, this book is a description of people's "situations." It is organized into four parts. In Part One, "From Eden to Cajamarca," Diamond establishes why proximate (first-stage) explanations do not offer ultimate answers, and why racist biological explanations are without validity in explaining the lopsided outcome of the modern world. Diamond also examines how patterns of human evolution relate to uneven technological development, how cultures evolve, and how past collisions between cultures with disparate resources (proximate causes) are responsible for contemporary economic relationships. Part Two, "The Rise and Spread of Food Production," delivers the ultimate causes of resource disparity and is the strongest part of the book. Diamond offers a comprehensive discussion of the effects of plant and animal domestication on human societies. Engaging chapters overflow with details of how, when, and where food production and animal domestication originated. His basic argument is that "food production *evolved* as a by-product of decisions made without awareness of their consequences" (p. 106, emphasis in original). Culture is either determined by resources or relegated to the role of arbitrary preferences, "such as considering fish either delicacies or taboo" (p. 108). According to Diamond, the bases for social inequalities lie in climate, environment, the tilt of the earth's axes, and the wild plants and animals available for domestication.

Part Three, "From Food to Guns, Germs and Steel," brings us back to proximate causes with a review of microbe strategies

and human vulnerabilities, followed by an account of the development of writing as a "modern agent of conquest" (p. 216) made possible by stored food surpluses. In a more difficult chapter, Diamond documents 14 explanatory factors for how differences in technology arose (p. 249), including the hypothesis offered by my friend in northern Mexico, "that technology thrives in a rigorous climate where survival is impossible without technology" (p. 251). Diamond does his best to show that these proximate explanatory factors fall short. That, instead, broad historical patterns need to be explained in terms of geography, ecology, and population density. He carries out a similar treatment for government and religion, continuing his central argument that food production makes complex societies possible. Part Four, "Around the World in Five Chapters," is in many ways a repeat of all that came before, but specific in reference to five geographic areas: Australia and New Guinea, East and Southeast Asia, Polynesia, the collision between Old World and New World, and Africa. Because of the repetition, each chapter in this section could stand alone from the book, and each could be assigned in a course on a particular cultural area. The book could end at the conclusion of Part Three.

I read this book as a potential supplement for my undergraduate course on Human Variation. However, I did not assign the book. Diamond is intent on demonstrating that biological explanations cannot account for either cultural differences or resource inequalities. He misses opportunities to detail aspects of human variation related to his topics, such as differential ability to digest available foods (e.g., lactose), genetic variation in relation to infectious diseases (briefly mentioned, p. 201), or variation in human fertility (briefly discussed as birth spacing, p. 89). This would be an appropriate recommended text for undergraduates in Introduction to Anthropology, Human Ecology, or Nutritional Anthropology. The style is conversational, little anthropological knowledge is assumed, the index is good, and the 32 portrait-like photographic plates are beautiful.

Two bothersome points should be mentioned. First, the question/answer format is a manipulative device to move the argument in one direction. Sometimes six or more questions are added consecutively to

get to the path Diamond wants to follow. Second, although Diamond discusses points of contention, it becomes obvious that he chooses dates needed to support his ultimate arguments. For example, he argues that humans did not arrive in the New World until 11,000 BC. Therefore, they lacked the time necessary to develop what was needed to turn the patterns of history around (i.e., guns, germs, and steel). That said, the book is consistent in argument, interesting, and accessible.

For anthropologists and human biologists familiar with the basics of cultural evolution (Marshall Sahlins and Elman Service) and cultural materialism, the first few chapters are an introductory review. However, as the book progresses and Diamond's arguments become more specific, the book becomes both informative and enjoyable, and highly recommended for a bus trip through Mexico.

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Encyclopedia of Human Biology, 2nd edition.
Edited by Renato Dulbecco. 9 Volumes.
San Diego, CA: Academic Press. 1997.
\$2,100 (cloth).

This encyclopedia purports to provide a complete overview of the current state of knowledge in contemporary human biology. It is intended to serve as a "solid base on which subsequent information can be readily integrated." The target audience is broad, including general readers with a background in science, undergraduates, graduate students, and practicing researchers and scientists. The articles, therefore, strive to be written so that the material contained in them is accessible to this general audience. Only a general knowledge of biology is assumed of the reader. Therefore, the amount of detail is limited to what is sufficient for an overview of topics. Specialized terminology is kept to a minimum, and when relatively arcane terms are used, they are explained in a glossary at the beginning of the article. A bibliography is provided at the end of each article for the more sophisticated reader.

Typical of an encyclopedia, topics are organized alphabetically. A most useful fea-

ture is the inclusion of an index volume (Vol. 9). This volume provides a guide to using the encyclopedia, which includes a brief description of the general organization of the encyclopedia, the specific format of the articles, and a list of contributors, as well as a cumulative contents, a subject index, and contents by subject area. The latter is particularly useful for locating information on general topics. The 8 volumes contain over 170 articles, covering human biology from A to Z, grouped into the following major subjects: behavior, biochemistry, biotechnology, the cardiovascular system, cell biology, dental and oral biology, the digestive system, endocrinology, evolution, food and nutrition, genetics, gerontology, hematology, immunology, the integumentary system, methods and materials used in human biology, microbial diseases, muscles, the nervous system, oncology, osteology and histology, parasitology, pathology, pediatrics, pharmacology, physiology, psychiatry, public health, the reproductive system, the respiratory system, sense organs, sociobiology, toxicology, and virology. The list of authors is quite distinguished, including recognized experts and Nobel Prize recipients.

Consistent with the encyclopedia's overall organization, the format of individual articles is designed to be user-friendly. Each article begins with an outline of its general content, which is followed by a glossary of important terms and a short statement that defines the nature of the topic under discussion and summarizes its content.

To evaluate the extent to which this work achieves its stated overall purpose of providing a complete overview of the current state of knowledge of contemporary human biology, I constructed a list of topics pertinent to an undergraduate introductory human biology course. In addition, to assess its more general usefulness for anthropologists, several departmental colleagues provided additional topics that they, or their students, would have cause to look up in an encyclopedia of human biology. The list included topics that can be broadly organized under the following seven general subjects.

The first general subject explored by the reviewer was life cycle, which included the broad topic of reproduction, as well as the more specific topics of gametogenesis, pregnancy, childbirth, reproductive endocrinology, embryology, gestation, puberty, menarche, senescence, and menopause.

The general subject of growth and development included the topics of developmental stages (the embryo, infancy and childhood, and adolescence), genetic and hormonal factors, growth disorders, speech and language pathology, psychobiology, and comparative anatomy (human/macaque).

Adaptation to altitude, heat, cold, hypogravity, and stress were included under the general subject of adaptation. Additional topics included on this subject are adaptational physiology, adaptation and human geographic variation, and adaptation in ancient populations.

Fifteen topics under the general subject of health and disease were explored: epidemiology, AIDS, infectious disease, anemia, immunity, stress, heart disease, prions, diabetes, antibiotics, osteoporosis, atherosclerosis, steroids, interleukins, and parasitism. Examples of other topics encountered during the review that would be of particular interest in anthropology are primate ecology and ecology in relation to emergent disease.

Human genome, heritability, population genetics, and behavioral genetics were topics suggested for the general subject of genetics. As would be expected, coverage of these topics, as well as many others, under this subject is extensive.

The general subject of evolution is adequately represented in this encyclopedia. All of the topics suggested by my colleagues were covered. These topics included human origins, the origins of language, early evidence for tool use, australopithecines, the evolution of bipedalism, and the origins of anatomically modern humans. The extent to which the coverage of this material is current is evidenced by inclusion of more recent fossil evidence, such as *Ardipithecus ramidus*, and the competing multiregional continuity and "out of Africa" theories for the origin of anatomically modern humans.

Finally, a number of other miscellaneous topics were suggested, including demography, race, carrying capacity, biorhythms, biomechanics, intelligence, the senses, work capacity, and ergonomics. Of the topics suggested, only carrying capacity and fluctuating asymmetry are not covered, and material on the important and perpetually controversial subject of intelligence is minimal.

Overall, coverage of the subject of human biology by this encyclopedia is thorough, providing several articles relating to a particular subject. Developmental biology and

genetics, for example, have 18 and 58 listings, respectively, and include subjects as broad as puberty and population genetics, and as specialized as the embryonic development of bone, craniofacial genetics, and histones. From the reviewer's perspective as a physical anthropologist specializing in skeletal biology, the coverage of bone biology is quite good. The material on the embryonic development of bone, bone remodeling, metabolism, and health and disease is clear, concise, and up to date. The value of this encyclopedia to a broad audience is enhanced by its inclusion of sociocultural and psychological material as well as biological, e.g., rites of passage, sexual behavior, and dental mutilation. There is even a chapter that presents examples from nonliterate societies of how cultural (ritual) activity reinforces life transitions during the aging process.

In summary, the *Encyclopedia of Human Biology* is comprehensive, well organized, and appropriate for a wide audience of readers interested in human biology. The only significant drawback is its \$2,100 price. Periodic publication of yearbooks, rather than completely new editions, might help minimize the cost of upgrading. It would be useful if it were made available on CD.

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Bones in the Basement: Postmortem Racism in Nineteenth-Century Medical Training. Edited by Robert L. Blakely and Judith M. Harrington. xxi + 380 pp. Washington, DC: Smithsonian Institution Press. 1997. \$45.00 (cloth).

I have been looking forward to this book since 1993 and a couple of phone conversations with the late Bob Blakely in the course of trying frantically to save from incineration the contents of Michigan's 19th century medical school cadaver disposal pit. Like those of the Medical Colleges of Georgia and Virginia, Michigan's had been discovered during the course of construction on campus. The grant proposal copies and article drafts Bob sent me were instrumental in convincing a reticent Business Administration Vice President of the scientific value of the site and the need to save the contents.

I can say *Bones in the Basement* was worth the wait with few reservations. The dozen contributors (including the editors) have worked through a mountain of material to produce an impressive piece of multidisciplinary anthropology. The 12 chapters present a scientific and social analysis of the Medical College of Georgia (MCG) archaeological site and its considerable assemblage of cultural and material artifacts. The fact that only three of the 12 contributors held doctoral degrees when the book went to press in no way detracts from the technical competency of the analysis. While I may take issue with the details of some of the conclusions they reach, I highly recommend this volume as background reading for anyone interested in historical archaeology or medical history. These researchers did a superb job in the design and execution of this project, and the National Endowment for the Humanities, source of most of the support for the project, certainly got their money's worth.

The first of three sections covers the discovery of the site, an overview of the contextual history of the building, and an analysis of the trove of artifactual and faunal material recovered. Part 2 focuses on reconstructing 19th century dissection procedures from a comparative experimental perspective, an overview of cadaver procurement at MCG, and a discussion of race and the political context of medicine in society in 19th century Georgia. This section also presents a sociobiographical portrait of Grandison Harris, the individual at MCG responsible for making certain there was an ample supply of cadavers for anatomical and surgical instruction. The final section provides a physical and sociocultural examination of the human remains. Trace element analysis is used for dietary reconstruction and compared with perspectives drawn from the comparative osteological literature. A general picture of the health status of the MCG sample is presented in a chapter on paleopathological analysis. The two final chapters move away from physical anthropology to present an ethnographic interpretation of data collected in interviews with modern medical students and Augusta residents.

The authors conclude that White, European-derived society perpetrated and perpetuated horrendous injustices on the poor, disempowered, and disenfranchised. They

suggest that this was standard social protocol throughout the developing 19th century United States, and that in many cases these practices continue to the present day. This, of course, is not new and would hardly merit mention in the face of the new information that is presented, but this theme is stressed continually, predictably, and finally somewhat repetitively at every possible opportunity. The authors leave no doubt in the reader's mind that medical education in the 19th century US, not just the antebellum South, was actually part of a larger social scheme specifically engineered to disempower and bar the underclasses, particularly those of sub-Saharan West African descent, from achieving the developing American Dream. Much of the contention for sociopolitical separation along color lines is based on the forensic analysis of the skeletal material, specifically 24 tibiae, used for "racial" identification. In the editor's chapter, "Grave Consequences," the frequency of 19 tibiae judged to be from Blacks to 5 tibiae judged to be from Whites does indeed suggest an approximately 4 to 1 preference for Blacks over Whites as dissecting-room subjects. In a subsequent chapter, however, another of the contributors finds those same ratios to be 1.5 and 1.1 to 1 (Blacks to Whites), still a majority but by a considerably smaller margin. These sorts of small material discrepancies may lead the reader to consider that they may be overstating the case somewhat. In the spring of 1878, the body of John Scott Harrison (son of President William Henry Harrison) was discovered hanging in the anatomy lab at the Medical College of Ohio in Cincinnati. The body of a recently deceased family friend of the Harrison's, Augustus Devin, was traced to the anatomical laboratory of the University of Michigan at Ann Arbor (Huelke 1961). Neither of these men were poor, Black, or indigent, and the occurrence of events of this nature north of the Mason-Dixon line scarcely lends support to the "white supremacist upper classes preying on the poor black underclass" theme that runs through much of the interpretation presented in the book. The preceding as well as other incidents from the early years of Michigan's medical school are documented by Huelke (1961), an article discussed by Bob Blakely and myself over the phone, but, curiously, never cited by any of the authors in the MCG volume. This volume presents a

sterling example of project design and execution, but the authors' interpretations and extrapolations beyond 19th century Augusta may be projecting a little beyond the template.

On the other hand, they may not. There is no comparative osteological work and documentation. I am familiar with much of the literature cited by these authors, and there is little in the way of osteological reports on 19th century medical ossuaries (or dumps) from north of the Mason-Dixon Line. A critical distinction in the interpretation of this material is to be made regarding treatment on a local or regional versus national scale. This volume provides a great start, but more sites should be investigated, perhaps beginning with the Michigan Anatomy Department, in order to determine if the authors' generalizations are accurate regionally or nationally. The claims for a nationwide conspiracy to denigrate Blacks, particularly in death, demand independent verification.

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Adaptation to Malaria: The Interaction of Biology and Culture. Edited by Lawrence S. Greene and Maria Enrica Danubio. xiv + 490 pp. New York: Gordon and Breach. 1997. \$68.00 (cloth).

In areas where *Plasmodium falciparum* malaria is or has been endemic, it has left its mark on the genetic structure of the human population. The presence and high frequency of sickle cell anemia, thalassemia, and glucose-6-phosphate deficiency (G6PD) have been attributed to natural selection by the malaria parasite. It has often been suggested that malaria must also have selected for certain other biocultural factors, such as dietary patterns, which might augment, complement, or even hasten the genetic basis of resistance. This book focuses on the study of selection in humans due to both the malaria parasite and human dietary patterns, which affect over 400 million people

worldwide, as a model for genetic selection in humans due to both the malaria parasite and human dietary patterns. One of the central points brought out in the book is that the various alleles for G6PD-deficiency have co-evolved with culturally constructed cuisines that incorporate oxidant-containing plant foods and therapeutic regimens that lower erythrocyte reducing capacity and thus maximize the antimalarial protection offered by alleles for G6PD deficiency.

This book is structured in three sections and 16 chapters discussing various aspects of G6PD-deficiency in human populations and its link to resistance to malaria. The entire spectrum of the biology of G6PD-deficiency is presented, spanning from molecular biology of the gene to enzyme kinetics, red cell metabolism, and finally to clinical and cultural manifestations.

The first section of the book focuses on the molecular genetics and biochemistry of G6PD-deficiency. Particularly outstanding is the first chapter, by Gaetani and Ferraris, dealing with the basic biochemistry of oxidative stress and G6PD-deficiency. This chapter also usefully categorizes the plethora of G6PD alleles and their properties, and the role of catalase in G6PD-deficiency. The second chapter, by Turrini et al., presents a detailed biochemical description of favism, the hemolytic crisis following consumption of fava beans, and thereby introduces a biological basis for dietary interaction with G6PD deficiency. He also presents evidence supporting a novel hypothesis involving auto-antibodies which facilitate the antimalarial effects of G6PD-deficiency. Following a provocative chapter by Meloni and Meloni detailing clinical consequences selecting against G6PD deficiency, Ruwende et al. present an outstanding case-control study detailing the relative protection against uncomplicated and severe malaria afforded G6PD-deficient individuals in Africa.

The second section of the book examines the mechanism of antimalarial protection of G6PD-deficient erythrocytes and interactions between dietary and medicinal factors promoting parasite destruction. Chapter 6, by Har-El and Chevion, and Chapter 10, by Greene, stand out as excellent discussions of the roles of other nutrients such as iron, vitamin C, copper, zinc, calcium, and riboflavin in modulating favism and antimalarial protection. Greene also presents some evi-

dence supporting the notion that dietary patterns have been developed that potentiate the antimalarial effect of G6PD-deficiency. Chapter 8, by Etkin, and Chapter 9, by Jackson, focus on specific plants that promote pro-oxidant status that might potentiate protection against malaria. Etkin's summary of plants from indigenous pharmacopeias that have been shown to have antimalarial action is very useful. Etkin contends that the biocultural use of oxidant-containing plants and medicines is the biocultural analog to G6PD-deficiency, achieving the same effect but at a lower cost than genetic adaptations. Jackson, in the most theoretical chapter of the book, attempts to develop a conceptual model for human-plant-parasite interactions.

The last section of the book is essentially a series of historical and genetic studies examining factors accounting for distribution of G6PD-deficiency alleles in southern Italy and Sardinia. Particularly noteworthy are Chapter 13, by Tagarelli et al., presenting evidence for a selective advantage in fertility provided by G6PD-deficiency, and Chapter 16, by Bottini et al., dealing with interactions between G6PD-deficiency and other hemoglobinopathies, such as thalassemia, and allelic forms of acid phosphatase.

Though well conceived and executed, there are certain aspects of the book that may present minor irritations to some readers. First, the title is somewhat misleading, as it implies that a greater scope of information may be discussed regarding biological and cultural adaptation to malaria, such as sickle cell trait, thalassemia, or other hemoglobinopathies, as well as other cultural beliefs surrounding malaria sickness. Also, the basic underlying mechanism whereby G6PD-deficiency confers resistance to malaria, by promoting oxidant stress, is mentioned in the Introduction of almost every chapter, along with basic data on malaria disease burden worldwide. When read in one sitting, this tends to detract from the continuity, although it would be useful to those reading only selected chapters. A small section or chapter dealing with malaria immunity and pathology would have been useful. This is particularly so due to the heavy focus on oxidative stress as the main mechanism underlying resistance to malaria via G6PD-deficiency, which might leave many readers unfamiliar with malaria with an unbalanced view of the role of

oxidative stress on the immunopathophysiology of malaria. It would also have been useful to have discussed some of the data suggesting that the modulation of oxidant-status may not be the only mechanism underlying the effects of G6PD-deficiency. The last section of the book, dealing with the history of malaria and the distribution of G6PD-deficiency in southern Italy and Sardinia, consists of well-written scholarly works, but may appear less relevant given the greater focus on African data for G6PD-deficiency and diet in most of the other chapters.

Overall, the volume is very well put together and extremely informative. It can be highly recommended for anyone interested in aspects of human adaptation to malaria and infectious diseases in general. It also contains information of interest to biochemists, molecular biologists, and evolutionary biologists with an interest in malaria or oxidative metabolism of the red cell. Its appearance is particularly timely given recent interest in the role of micronutrients in the prevention and treatment of malaria. The book sets a positive precedent for future such volumes which might focus on other genetic traits conferring resistance to malaria and their biocultural modifiers.

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Revista Española de Antropología Biológica, Vol. 18, Especial Biodemografía. 272 pp. Madrid: Sociedad Española de Antropología Biológica. 1997. \$20.00 (paper).

This special issue/monograph consists of 18 papers by an international group of authors reporting on biological anthropology research conducted in several different countries in Europe (e.g., Belgium, England, Spain, Portugal, Czech Republic) and the Americas (e.g., Argentina, Brazil, Chile, Cuba, Peru, Venezuela). The collection is not organized into sections, although three basic topics are covered. Seven articles deal with population genetic structure, including pedigree analyses, genetic marker distributions within and among populations,

isonymy, heritability, gene flow and admixture/heterozygosity estimates, and tracking the evolutionary fate of mutations and genetic diseases. Six contributions are concerned with biodemographic correlates of genetic phenomena—fertility, mortality, mate selection patterns (e.g., inbreeding vs. exogamy), and migration effects on gene frequencies. Two of these papers describe genetic consequences of fertility and natality variations, including seasonality of weddings and births as well as the outcomes of contraceptive usage. The final five papers address the epidemiological and health aspects of population dynamics and the demographic impacts on genetic diseases. Three of the latter articles focus on the interaction of health, disease, and patterns of mortality: causes of death, mortality rates, age and gender differences, and biological/genetic results of epidemiological transition.

Examples of specific studies include the geographic origin of particular genes among the Berbers of Morocco, intermarriage between indigenous and immigrant populations in Belgium, inbreeding and consanguinity in high and low altitude regions of Argentina, mortality trends over a 150-year period in Spain (1841–1990), population history and demographic change in Tierra del Fuego, and migration and mate selection in rural communities in England. Crow's Index for the Opportunity of Natural Selection was calculated with ample data in two papers. An outstanding piece by P.D. Raspe and G.W. Lasker provides novel estimates of genetic diversity based on statistical analyses of surname distributions in rural English villages. A thorough case study is presented on endogamy and consanguinity in a rural community in Spain.

This special issue/monograph contains some solid and concise research results of interest to population geneticists and biological anthropologists investigating human variation, especially the interaction of genetics and demographic forces. Brief translations are included in Spanish and English to allow wider readership. The only real negative is the lack of editorial introduction or commentary (condensed on one page).

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