Book Reviews


The brain holds a special place in the study of human evolution and, rightly so. Our encephalized state lies at the heart of our social complexity and accounts for the sophistication of our artistic and technological achievement. But if large brains unleashed our quintessential qualities as a species, this unquestionably came at a steep price. The human brain consumes a great deal of the body's energy, and even temporary disruption in its supply leads to irreparable damage. Much work on hominin encephalization has focused on the changes in diet, physiology, metabolism, and body composition required to walk this metabolic tightrope and free up fuel for a large brain while protecting its delicate supply line.

From its title, Stephen Cunnane's SURVIVAL OF THE FATTEST: THE KEY TO HUMAN BRAIN EVOLUTION might sound like a synthesis of this literature. Instead it is primarily a defense of the shore-based diet hypothesis, itself the loose progeny of Alistair Hardy's aquatic ape hypothesis. Cunnane notes that brain growth requires nutrients, vitamins, and minerals that are synthesized by the body inefficiently if at all. These “brain selective nutrients”—iodine, iron, copper, zinc, selenium, and the long-chain polyunsaturated fatty acid, docosahexaenoic acid—presumably were required in higher quantities to support encephalization. Because maritime foods like shellfish are among the rare naturally occurring foods enriched with these nutrients, the shore-based diet hypothesis proposes that hominin encephalization occurred on, and indeed was triggered by arrival at, the shoreline.

To help make this case, several early chapters are devoted to brain biochemistry and nutrition. Although repetitive in places, these are the book's best chapters, for this is Cunnane's area of expertise. Here we learn the importance of iodine for normal brain development, the metabolism and structural role of docosahexaenoic acid, and dietary sources of these and other nutrients critical in brain development. This review is background for the book's broader evolutionary thesis, and here Cunnane quickly runs into trouble. In the introduction, he frames the book's central problem by noting what he sees as a mystery: the slight reduction in hominin brain volume during the past 30,000 years. He then poses a question that sets up key themes for the volume: “Agriculture was a major invention and has been widely adopted in the past 5,000 years; could it (or any other significant dietary change) affect brain size on a global basis?” (p. 49).

Ignoring the fact that bodies, including brains, have shrunk since the late Pleistocene, Cunnane focuses on the decrease in absolute brain volume, creating the appearance that brain size has regressed as populations have moved away from the shoreline. In fact, relative brain size is about the same today as it was during the late Pleistocene, and the suggestion that this was a period of cognitive decline is clearly problematic. It was during this time that we see the first explosion of cultural diversification and a steep rise in the quality and sophistication of technology, not to mention the first examples of symbolic representation and art. Such unsound evolutionary reasoning is, unfortunately, no stranger to this volume.

One chapter reviews evidence that hominins inhabited shorelines, used riverine areas, and ate fish. That our ancestors exploited highly productive habitats is not surprising, nor is it evidence that a shore-based diet was necessary for encephalization. The rapid encephalization of Homo predates the first evidence of maritime food use by at least 400,000 years. By contrast, there is extensive evidence for hominin carnivory and carcass scavenging at early Homo sites, and as others have shown, scavenge or hunted brain tissue would have provided a rich source of docosahexaenoic acid and other scarce nutrients.

To support his model, Cunnane points to evidence that diets consumed by many contemporary inland human populations impair cognitive development. While iodine deficiency and cretinism are endemic in certain regions with leached soils, this is of questionable relevance for an understanding of hominin encephalization. Not only did encephalization not occur on the shore, but much has been achieved by modern landlocked populations (at Harrappa, Ur, Teotihuacan, and Cuzco, to name a few) without the benefit of maritime foods or iodized salt. With respect to essential fatty acids, Cunnane concedes that “it is possible to achieve normal brain function without a dietary source of docosahexaenoic acid.” (p. 163). He further undermines his hypothesis when he discusses vegan children who eat no meat, dairy, or eggs—the main sources for polyunsaturated fatty acids—yet have normal cognitive development.

Early on, Cunnane proposes a paradox that may be viewed as a straw man: “How did humans get bigger, more sophisticated brains without the skills that already need a bigger brain?” (p. 30). He sees a fundamental flaw in hypotheses that explain encephalization by reference to enhanced brain function, for the advantages of brain expansion can be enjoyed only after the brain is enlarged. As Darwin showed, this is only a problem if one envisions a trait like the brain as an all-or-nothing state rather than the product of an incremental process that gradually ratchets up complexity.

Arguably there is no paradox here, but the book culminates by proposing an odd solution: encephalization was not driven by the benefits of large brains but was instead a by-product of diet change. Without the benefit of evidence, Cunnane asserts that animals, including primates, have unrealized capacities for brain growth. He claims that diets poor in brain selective nutrients restricted a latent genetic capacity for brain expansion that was expressed in our ancestors once they stumbled upon the unique nutritional resources of the shoreline. According to Cunnane, our large brains initially served no function, nor did they provide an adaptive advantage. Life was so bountiful in this utopian setting that “hominids heading towards the human lineage were intent not on survival but on play” (p. 220), and “the first primitive tools were useful for play activities but they were not necessary for survival ... They were optional. Effectively, they were playthings” (p. 218).

This model has obvious flaws. If it were correct, we should see diet-related variation in relative brain size.
among modern human populations, not to mention other species. The shore-based Inuit should have higher encephalization quotients, and the oceans and shorelines should be loaded with highly encephalized species. Instead, brain size scales tightly with metabolic rate, suggesting deeply conserved energetic constraints on brain growth. And if the absence of a shore-based diet was all that held back this latent genetic potential, why was hominin brain expansion a gradual and intermittent process requiring millions of years rather than an abrupt response to arrival at the shoreline?

This model also misses an important point, for what requires explanation is not merely the size of the brain but the entire complex of coevolved supporting traits. Although the human brain is unusual for its size and energetic cost, one important mystery is why, despite this, humans do not have an elevated metabolic rate. Brain expansion must have been accompanied by anatomic and metabolic trade-offs, which have been the subject of much prior research. The book acknowledges some of this complexity in passing (such as the two sentences devoted to the expensive tissue hypothesis), but ultimately fails to synthesize this literature. Instead, Cunnane proposes that the brain and its supporting cast were somehow catalyzed to their present form by an abundant shoreline. The complexity of coevolved traits, combined with the opportunity cost of diverting 20–70% of the body’s energy to fuel the brain, renders an “accidental” encephalization hypothesis of this sort untenable.

Because this book is marketed for a public audience, it does not uphold the same scholarly standards as writing aimed at scientific peers. For instance, there are no in-text citations but merely a bibliography. This enables some of the book’s speculative excesses and makes it inappropriate for graduate students or researchers looking for an entry point into this literature. At the same time, it is a source of concern that this book is designed for public consumption. Evolutionary scenarios that would not stand up to scientific scrutiny will instead enter directly into already problematic public narratives about human evolution. In this sense, it does our research community a disservice by making the study of human evolution out to be little more than the spinning of just-so stories.

Survival of the Fattest is most successful in making the case that brain development requires certain nutrients that are rare in most ecologies. This is an interesting point, but the leap that a shore-based diet was a necessary condition for encephalization denies the fact that hominin achievement, for millions of years, unfolded far from the shore. Although the title of the book implies a focus on energetics and body composition, there is little attempt to integrate prior work in this area. In several passages Cunnane laments the fact that anthropologists have, by and large, avoided the aquatic ape hypothesis and its shore-based progeny. Having finished this book, I have a hunch this trend is destined to continue.

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Studies of culture are a growing field of inquiry in animal behavior and primatology. Observations of sweet potato washing and wheat sluicing by Japanese macaques represent textbook examples of animal culture; but these are beginning to give way to high-profile research on the cultural activities of our closest living relatives, chimpanzees. Bill McGrew has played a central role in the development of studies on chimpanzee culture. In The Cultured Chimpanzee—Reflections on Cultural Primatology, he provides an overview of three decades of research.

McGrew and Tutin’s 1975 observation of the grooming hand clasp at the Mahale Mountains set the stage for the study of chimpanzee culture, and the book begins with a personal account of that pioneering study. In the introductory chapter, McGrew asks those who believe that culture is a uniquely human attribute to keep an open mind and outlines some reasons to think otherwise. If one assumes that culture is not restricted to humans, how can it be recognized in other animals? Culture means different things to different people, and in Chapter 2, McGrew tackles the thorny issue of how to define culture. A definition universally acceptable to all does not exist, and differences in definition undoubtedly explain why some are willing to accept culture in animals while others do not. McGrew defines culture as “the way we do things.” At first blush, this characterization might seem odd and imprecise, but it nonetheless provides an operational means to identify culture in animals: standardized acts that are practiced by a collective group of individuals and that furnish a sense of identity to the collective by differentiating “us” from “them.” Culture is studied by academics from several different disciplines. In Chapter 3, McGrew summarizes the contributions that four distinct fields—anthropology, archaeology, psychology, and zoology—make to the study of culture. Here, he notes that each discipline addresses different kinds of questions corresponding to the what, when, how, and why of culture. Complete understanding of culture in primates requires answers to all four questions, but the marriage of disciplines necessary to achieve this awaits consummation.

In Chapter 4, McGrew reviews the evidence for culture in nonprimate animals, including fish, birds, and other mammals. He concludes that, with the exception of song learning in birds, convincing cases for culture can be made for very few taxa because of a paucity of evidence for two defining features, collectivity and identity. Chapter 5 summarizes the evidence for culture in primates other than chimpanzees. While there are over two hundred species of living primates, reliable data exist only for cebus monkeys, macaques, orangutans, and bonobos. McGrew outlines studies on all four species that suggest

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just make it operational’; ‘don’t wait to know how before you ask what? where? when? why? etc.’; ‘start with material culture, but don’t stop there’; ‘beware of anecdotes, but don’t ignore them’; ‘raided sociocultural anthropology selectively’; ‘engage with archaeologists—they have similar problems’; ‘experiments are wonderful but hard to do.’ In the final chapter, McGrew continues to look forward by considering the future of cultural primatology. Here he suggests that our understanding of the cultural activities of primates would benefit if primatologists begin to collaborate with paleoanthropologists, archaeologists, and cultural anthropologists.

In sum, The Cultured Chimpanzee is an informative book that does an exemplary job summarizing studies of primate culture. It is written in a breezy style that will make it readily accessible to specialists and nonspecialists alike. McGrew’s unswerving commitment to the analysis of animal culture in an objective, scientific manner has done much to advance the field and popularize the topic. Studies of culture in animals continue to generate significant scientific attention and media publicity. For those interested in learning what all the excitement is about, this book will provide an illuminating read.
tribution and types of disease. A similar line of reasoning runs through his discussion of translation. When it comes to translating research findings into action, ethnographic techniques and deeper engagement with communities are critical for ensuring that interventions are locally appropriate and, hopefully, effective. Working with anthropologists may be a good step towards understanding why knowledge does not always translate into action. After all, as Trostle notes, “Anthropologists are trained to look for local rationales” (p. 123). Culture, therefore, pervades all aspects of epidemiological study and influences health outcomes; evidence of this latter theme is peppered throughout the book.

As much as I thoroughly enjoyed reading this book—so much so that I read it almost straight through in one night—it was not the book I expected. I had anticipated a book about models and theories of culture and how these might help us explain why cultural differences emerge and persist, even when they may erode health and well-being. That book still needs to be written. Epidemiology and Culture takes it for granted that cultural differences do exist and then sets off to show how these differences affect (or infect?) all stages of epidemiological practice—from exposure to classification to collection, analysis, interpretation, and translation of data. As such, the book is written more for an epidemiology audience. Nevertheless, it is an important and timely book as evidenced by recent writings in international epidemiology journals on the role of culture in public health. It is also a must-read for its historical background but, more importantly, for its extended critique of often unstated or untested assumptions in the science of epidemiology.

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This book detailing the position of the body in osteoarchaeological and archaeological practices seeks to reconcile a conflict between praxis and theory in the British tradition. It is clearly written from the British anthropological perspective, and those schooled in the American tradition will get a feel for how different the practice and pedigree of bioarchaeology (or osteoarchaeology) is in the two countries. Osteoarchaeology in Britain was shaped by different influences than American bioarchaeology, which had its underpinnings in the related disciplines of archaeology and biological anthropology. In Britain, the foundations of osteoarchaeology were built upon the confluence of anatomical and medical specialists, and thus the flavor of osteoarchaeology is medically oriented, tinged by a clinical, diagnostic framework.

In the first chapter, Sofaer outlines these ontological beginnings and highlights the position of human remains in archaeological contexts as one of tension, where science conflicts with humanism; biology wars with theory; and archaeologists and osteoarchaeologists are in oppositional conflict. Sofaer argues that the archaeological sciences have an implicit underappreciation of the validity of osteoarchaeological contributions, “leading to feelings of marginalisation” (p. 8) among osteoarchaeologists who are perceived as “service providers to those higher up in the disciplinary hierarchy who carry out the overall synthesis and thus the ‘real’ interpretation of the data” (p. 8). Like Jane Buikstra before her (in What Mean These Bones? Studies in Southeastern Bioarchaeology. M.L. Powell et al. 1991), Sofaer argues that osteoarchaeology can contribute to archaeological method and theory beyond simply providing specialized site report appendices.

Chapter 2 examines the human body as an archaeologi- cal resource. Sofaer reviews the changed role of the body within New Archaeology’s processualist approach that elevated human remains from mere signifiers of human site occupation to resources that could be examined for population-level data regarding human presence and adaptation. The role of the body as both a biological entity and a cultural construct is reviewed via postprocessual and embodiment theories, many of which contest the biological component of the body in favor of its cultural construction. Sofaer promotes the validity of the science-based osteoarchaeological approach to those who argue for the body’s position as an embodied object with layered material meanings (i.e., postmodernist and constructionist approaches).

Sofaer asserts that “ostearchaeologists have not always been reflexive in their practice and have only rarely engaged with developments in theoretical archaeology, seeing it as lacking relevance to them” (p. 29).

Chapter 3 situates the body at the intersection of archaeology and osteoarchaeology, attempting to identify oppositions, boundaries, and dualities: nature versus biology; inside versus outside, fleshed versus unfleshed, mind versus body. Sofaer outlines the ingrained perception (especially among postprocessualists) of osteo-archaeology as a technical and atheoretical science in contrast to the more theoretically aligned and interpretive discipline of archaeology.

Chapter 4 continues these themes, examining how the body is differentially categorized, objectified, and materialized by competing schools of thought. It focuses on archaeology’s elevation of the cultural and social aspect of the body to the detriment of its inherent biological component. Sofaer examines the kinds of data that can be obtained from the skeleton via activity-related changes, noting that “if bodies are regarded in the same way as objects, then they can become foci for archaeological investigation using archaeological methods targeted at understanding material culture” (p. 88).

Chapter 5 highlights sex and gender studies as an arena in which the body is divided into contrasting social and biological territories, with the tension between archaeology and osteoarchaeology resulting from the “superimposition of cultural gender onto biological sex” (p. 89). Sofaer articulates the contributions that the physical body can make towards illuminating the skeletal
expression of “gender as a cultural construct distinct from sex” (p 98) by looking at osteological changes indicative of differential division of labor.

The final chapter is an examination of the way in which skeletal age is utilized, the significant tension it invokes in categorization (i.e., between child and adult), and how the continuum of senescence signifies biological and social changes. Sofaer offers alternatives to reconceptualize how physiological age can dovetail with interpretive theories, utilizing biological categories as objects much like grave goods or associated artifacts.

This volume stresses the validity of osteoarchaeological data, and as such appears directed towards an archaeological audience. Those bioarchaeologists trained in the American anthropological tradition likely will not find common ground with Sofaer’s thesis regarding the anthropology of American-trained readers of the American Journal of Physical Anthropology, it will appeal to those interested in understanding postprocessual, constructionist, and postmodernist approaches to the body, embodiment theory, sex and gender studies, and the epistemology of British osteoarchaeology. Additionally, those trained in the British anthropological tradition may find validity in the arguments framed by Sofaer, clarifying a duality in the way osteoarchaeology and archaeology are practiced, and in how the body serves as the highly contested arena in which this conflict plays out.

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