Book Reviews

Evolution in Health and Disease, 2nd edition. Edited by Stephen C. Stearns and Jacob C. Koella. xxi + 374 pp. New York: Oxford University Press. 2008. $150.00 (cloth), $69.95 (paper).

The objective of this edited volume is to showcase the relevance of evolutionary principles to medical practice and thought. The volume follows the same format as the first edition, published in 1999, but with a major overhaul; as noted by the editors in the preface, only 11 of the 61 authors from the first edition contribute to the second edition, and nearly 60% of all the references in the second edition have been published since the first edition. This volume, along with a recently updated version of a complementary edited volume (Trevathan et al., 2008), demonstrate the vibrancy of research in evolutionary medicine and the tremendous growth that has taken place over the past decade.

The volume is organized into five sections: I. Introduction; II. History and variation of human genes; III. Natural selection and evolutionary conflicts; IV. Pathogens: resistance, virulence, variation, and emergence; and V. Non-infectious and degenerative disease. With the exception of the introduction, each section is comprised of multiple chapters, and the final chapter in each section was designed to address important issues related to the section that were not covered in previous chapters.

The introduction provides numerous examples of the insights that can be gained from applying evolutionary theory to medicine, many of which are taken up in greater depth in subsequent chapters. The introduction also surveys key concepts from evolutionary theory, and walks the reader through the logic of applying these concepts to medical issues. Brief discussions of natural selection, micro- and macro-evolution, and design trade-offs provide a good foundation for the rest of the volume. However, the coverage here is rather cursory, and is not likely to provide sufficient depth for readers without some prior familiarity with these concepts.

Part II comprises four chapters on the relationships among human evolution, genes, and health. The first chapter discusses the geographic distribution of infectious diseases and presents evidence for signatures of selection on the human genome. The second and third chapters review genetic markers that are used to detect variation in the human genome and to indicate risk for disease, and underscore the importance of understanding human genetics in the context of ecology and population structure. The final chapter provides an excellent review of the origins and extent of human genetic variation, and the implications for understanding complex, or non-Mendelian, diseases such as alcoholism.

Part III includes four loosely related chapters, each of which stands alone as a compelling demonstration of the explanatory power that can be gained by considering clinical phenomena in light of evolutionary concepts. The first chapter reviews evidence for intergenerational conflicts in pregnancy and childhood, reminding the reader to ask "adaptive for whom?" when considering traits related to human reproduction. The second chapter outlines the roles played by hormones in mediating life history trade-offs across the life course in males and females, with implications for reproductive function and as well as clinical outcomes like metabolic syndrome and reproductive cancers. This chapter is followed by a discussion of the origins and functional significance of genetic variation in the major histocompatibility complex that highlights its contributions to antipathogen defenses, mate selection, and reproductive outcomes. Lastly, a chapter on human evolutionary and behavioral ecology underscores the importance of phenotypic plasticity and reaction norms to understanding human variation, and discusses the insights into human health that can be gained by applying concepts from kin selection, sexual selection, parental investment, and life history theory.

Part IV receives the most attention, with eight chapters dedicated to issues related to the ecology and evolution of pathogens responsible for infectious diseases in humans. The first two chapters discuss the implications of antibiotic use and vaccination for pathogen evolution, with an emphasis on processes leading to resistance and increased virulence. Both chapters highlight the importance of evolutionary thinking for strategies of drug design and delivery that anticipate these processes, rather than react to them after the fact. The following chapter reviews current thinking on the evolution of virulence, and focuses on costs and benefits for both pathogens and hosts in a range of contexts. Two chapters review the evolutionary origins and population structure of human viruses and pathogenic bacteria, respectively, while a third uses sequencing data to explore selection pressures and mechanisms of pathogen evolution. The penultimate chapter in this section discusses the biological processes leading to the emergence of new infectious diseases in human populations, and draws on evolutionary principles to predict which types of diseases are likely to emerge and how they may spread. The final chapter does an excellent job of synthesizing the prior chapters and pointing toward productive avenues of future research—a particularly welcome service given the number of chapters in this section.

The final section includes six chapters on noninfectious, degenerative diseases. The first chapter begins with the question "why age?" It reviews theoretical approaches to aging in evolutionary biology, and integrates mechanistic insights from molecular biology to provide a solid historical and conceptual introduction to the chapters in this section. The next chapter documents the importance of prenatal and postnatal environments in shaping disease risk in adulthood through modification of key physiological systems and also proposes a "developmental and evolutionary synthesis" that brings concepts like intergenerational signaling and phenotypic plasticity to a rapidly growing body of epidemiological research. This is followed by a chapter about lifestyle, diet, and disease that brings insights from evolutionary energetics to bear on emerging global epidemics of obesity and metabolic disorders. Two subsequent chapters apply complementary perspectives to the problem of cancer. The first uses a comparative approach to reveal that humans are uniquely vulnerable to cancer, and the second uses evolutionary principles and population dynamics to inform mathematical modeling of cancer initiation, progression, and therapy. The volume's final chapter highlights key trade-offs involved in aging (e.g., costs of reproduction), and discusses molecular

mechanisms that may underlie aging in light of these trade-offs.

The volume is intended for a broad audience, including students, researchers, and educators in the medical and biological sciences. It hits the mark in that most chapters succeed in integrating evolutionary principles and biological mechanisms for a richer understanding of clinically relevant processes and outcomes. Many readers—particularly those with limited backgrounds in biology or evolutionary thinking—will be challenged by the text, but it is likely that they will be convinced of the value of linking ultimate and proximate levels of analysis. The chapters are well-organized and refreshingly free of jargon, with good flow across the diverse range of topics. The volume could serve as the core text for a graduate (and perhaps advanced undergraduate) course in evolutionary medicine. Many, but probably not all, of the chapters would also make excellent additions to courses in human population biology, growth and development, life history theory, and global health.

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Integrating Evolution and Development: From Theory to Practice. Edited by Roger Sansom and Robert N. Brandon. xiv + 334 p. Cambridge, MA: The M.I.T. Press (A Bradford Book). 2007. $65.00 (cloth), $34.00 (paper).

The emerging hybrid field of evolutionary developmental biology, or "evo-devo," is gaining great momentum in elucidating the mechanistic basis of evolutionary changes in development. In their edited volume *Integrating Evolution and Development: From Theory to Practice*, Sansom and Brandon turn attention to the question: given this wealth of data, what can evo-devo tell us about the evolutionary process itself? The volume includes seven chapters devoted to disparate topics, resulting in a wide assortment of contributions to the main theme. Overall, the volume presents an abundance of reflection and speculation (the "theory"), but fewer concrete conclusions that might actually change the way evolutionary biologists are doing science (the "practice").

Manfred Laubichler and Jane Maienschein open the volume with a brief historical framework describing why considerations of development were absent from the study of evolutionary biology until the evo-devo synthesis. They conclude that present-day evo-devo is conceptually fragmented into several subfields that must be better integrated to gain further evolutionary insights. In the second installment, Werner Callebaut, Gerd Muller, and Stuart Newman describe the "organismic systems approach" to evolution, an alternative to the gene-centered, adaptationist view dominating current evolutionary thinking. The "OSA" deemphasizes the roles of changes in allele frequency and natural selection. Rather, this approach focuses on the phenotype as the target of evolution, and stresses the study of epigenetic (environmentally induced, rather than mutation-induced) mechanisms of evolutionary change. In the most theoretical chapter of the volume, Frederik Nijhout provides a clear, well-illustrated way to go from verbal descriptions of how genotype affects phenotype to concrete, mathematical models of this essential relationship. What is novel about his approach, which resonates with the themes of the volume, is that it gives equal weight to genotypic and environmental effects on phenotypic evolution.

Next, Gerhard Schlosser takes on the important topic of constraints. He suggests shared underlying mechanisms for different traits can act as constraints causing characters to coevolve, and argues that such coevolved traits should be considered units of evolution (rather than individual genes). However, disappointingly little attention is given to the basic question of how constraints can be realistically measured. Roger Sansom's chapter considers "evolvability" as its own adaptation, and provides an extremely thought-provoking series of speculations on this topic. He suggests the vast majority of evolution occurs via small, gradual changes and that this "gradualism" is an optimal strategy for evolvability (thus organisms have elaborate adaptations to reduce both the frequency and severity of mutations). He considers how maximizing "evolvabilty" could lead to trends in the hierarchical structure of development; for example, modularity of functionally related developmental mechanisms could be a way to minimize disruptions from mutations early in the developmental cascade.

The final two chapters concern topics specifically related to human biology. Paul Griffiths considers the application of evo-devo to the field of evolutionary psychology. He concludes that evolutionary psychologists must forgo their preoccupation with adaptive explanations for human behavior and refocus research efforts on shared common ancestry of psychobehavioral traits. Although his point is well taken, this idea is certainly not new—the field of animal behavior has been using a phylogenetic approach since its inception, with the advantage of being able to study subjects directly in their "environment of evolutionary adaptedness." The final chapter by William Wimsatt and James Griesemer delves into theoretical considerations of human cultural evolution. In this chapter, the idea of "generative entrenchment" (i.e. elements of early development are more likely to be essential and widely conserved) is applied to the evolution of culture. Focusing on the concepts of entrenchment and the idea of scaffolding (that certain aspects of culture facilitate further cultural development), they present a new approach to cultural evolution that accounts for cultural richness and complexity, as opposed to the simplified theory of "memes."

Because of the detailed coverage of a wide variety of independent topics, I found myself wondering for whom this book is really intended for—is it theoreticians,

empirical biologists, psychologists, sociologists? Unfortunately, as a volume it will not satisfy all of these audiences—certain chapters will resonate with experts in widely different fields, while others will seem either not relevant or overly technical. In this sense, the usefulness of reading the entire volume, rather than just a subset of chapters more relevant to one's own research, is equivocal. In addition, the book could have benefited from harsher editing of the more lengthy chapters. For the most part, the longer the chapter, the more jargon was used and background knowledge was assumed, the details of which can easily become overwhelming. Along those lines, it would have been helpful for the editors to introduce and define some of the recurring concepts (e.g. modularity, generative entrenchment) in their introductory section, along with foreshadowing the various ways in which these concepts are treated in subsequent chapters. I was also disappointed that, although a chapter on human psychology was included, there was no chapter on animal behavior, which has already begun to use evo-devo methods for inspiration in studying genetics and evolution of complex forms of animal behavior.

The most valuable aspects of this volume come from challenges to orthodox evolutionary theory. In recent years, researchers from other fields including animal behavior and microbiology have also begun to challenge purely Darwinian, single gene-centered evolutionary thinking. Importantly, this volume demonstrates that workers in the field of evo-devo are coming to some similar conclusions. Notably, these include the recognition of multiple levels of selection in evolution, epigenetic mechanisms for evolution that may rely only secondarily on genetic change, and an appreciation of the importance of other evolutionary forces besides natural selection.

Wimsatt and Griesemer argue the more "deeply entrenched" a cultural idea is (especially in science), the less likely it is to change over time. It remains to be seen how deeply entrenched biology's current view of evolution really is, and whether evo-devo can lead us to an evolved, new view of evolution.

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The Simian Tongue: The Long Debate About Animal Language. By Gregory Radick. xiv + 577 pp. Chicago: University of Chicago Press. 2007. $45.00 (cloth).

For those who have sought well-defined differences between humanity and other animals, it has been a bumpy road. Tool manufacture, cooperative hunting, self-awareness, innovation—all were once regarded as the domain solely of humans; but each has ultimately been documented among nonhuman animals. Even culture, that supposedly defining human trait, is known to exist in other species now as well (Whiten et al., 1999). But one sharp, qualitative divide may remain to give humanity a sense of uniqueness: language. More than anything else, language permeates all we humans do. The eminent biologist Thomas (1974; p. 112) called language "our most urgent biological function." And yet, countless other species, from invertebrates to vertebrates, likewise engage in intricate communicative affairs. Could not some of these—especially our closest kin, the monkeys and apes—possess language too, or at least a linguistic-precursor removed only in degree (not in kind) from our own communication system? If so, we humans might not be as biologically special as some would wish to think.

In *The Simian Tongue* Radick explores the tortuous history surrounding the question of whether nonhumans possess anything like language. The book's backbone is the playback experiment, a paradigmatic technique in which an animal's vocalization (the call of a monkey, say) is recorded and is then broadcasted back to determine how individuals respond to the sound alone. The first primate playback experiment ever conducted provides the book's opening. It was 1890, shortly following the invention of Edison's phonograph, and one Richard Lynch Garner set out to use Edison's recording and sound-reproducing machine to investigate the meaning of primate calls—a topic Garner himself dubbed "the simian tongue." Curiously, within a few years of Garner's widely acclaimed experiments further playbacks involving primates all but ceased. Not until nearly a century later did primate playbacks with a language-oriented focus reemerge when, in 1980, Robert Seyfarth, Dorothy Cheney, and Peter Marler documented semantic communication in vervet monkey alarm calls. So why did the playback technique receive plentiful publicity upon its first appearance at the end of the 19th century only to disappear for an extended time and then reappear near the end of the 20th century?

As a historian and philosopher of science, Radick endeavors to answer this question by tracing the social milieu from Charles Darwin's time to the present and exploring how this cultural matrix influenced scientists' perspectives on language and animal communication. Radick's book is divided into three parts, each with a specific explanatory goal. Part 1 aims to explain the events leading up to Garner's initial playback studies. Part 2 aims to explain why—despite immense attention from the media, the public, and established scientists—the playback technique dropped out of the scientific repertoire (or, in Radick's rigid words, became "an impossibility"; p. 9). And finally, Part 3 aims to explain why the playback technique, at least in its relevance for language evolution, became possible once again, decades later.

Three chapters compose each of these three parts. In Chapter 1, we meet Friedrich Max Müller, the renowned Oxford linguist who regarded language as "the one great barrier between the brute and man" (p. 16). Müller takes center stage in an extended controversy with Darwin and other evolutionists, disputing the plausibility of a gradual transition from animal communication to human language. In Chapter 2, the language debate spills over into the question of human–animal cognitive differences. Conwy Lloyd Morgan, founder of comparative psychology, follows on Müller's logic. If language and reason are inextricably bound and if animals lack language, then they must lack reason as well. Thus originates "Lloyd Mor-

gan's canon." Be skeptical of apparent animal cleverness and, for goodness sakes, avoid anthropomorphic overinterpretation. With this buildup of theoretical tension, Chapter 3 provides a breath of empirical resolution. Amateur scientist Richard Garner enters the fray, exploiting Edison's invention to ask whether simian utterances might represent meaningful, articulate speech rather than mere howls of acoustic noise. This third chapter, synthesizing Garner's letters, newspaper profiles, and life works, is the book's most original and exciting contribution—few of Garner's documents had been examined before.

Chapter 4 commences the second part of the book. Garner departs his preliminary work in American zoos, undertaking an expedition to French Congo (present-day Gabon). In the West African jungle, while entrenched in a metal cage, Garner translates gorilla and chimpanzees calls. But upon returning with scanty findings he becomes embroiled in accusations from the English press. Amid this scandal come changes within two key disciplines; in anthropology (Chapter 5) fossil hominid discoveries lure researchers away from studying their living primate relatives, while in psychology (Chapter 6) the birth of the learning-infatuated ideology of "behaviorism" spells doom for further naturalistic studies. Consequently, language-geared playback studies are curtailed.

In the third and final part of the book (Chapters 7–9), ethologists come to the rescue, reviving the playback technique to discover that primates' natural vocalizations in the wild can convey sophisticated symbolic information. These three chapters are effectively a biography of the distinguished zoologist Peter Marler, chronicling his wide ranging studies of animal communication. A fascinating element of this part of the book is the inclusion of original letters exchanged between Marler and his then-postdocs Cheney and Seyfarth while the latter were carrying out the experiments in the field. Complementing this correspondence are personal interviews the author conducted with each scientist, adding a valuable personal facet to the narrative.

So is language a humans-only club? Syntax likely holds the key, though a complete answer still requires further careful science (Hauser et al., 2002). As for history, Radick's book offers a tremendously rich and stimulating compendium of the scientific approaches and personalities behind the ongoing study of language evolution. Alas though, the book's tone smacks of determinism, asserting that scientific trajectories are fundamentally socially constructed. Such dubious claims might melt away if historians ever had to venture falsifiable predictions rather than just cook up *post-hoc* explanations. Nevertheless, *The Simian Tongue* should interest many within the biological and behavioral sciences, let alone anyone endowed with language and a curiosity about its origin.

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Elizabeth Blackburn and the Story of Telomeres: Deciphering the Ends of DNA. By Catherine Brady. 392 pp. Cambridge, MA: The MIT Press. 2007. $29.95 (cloth).

This book sets out to do something difficult: to tell the story of how a major field of scientific research developed and, at the same time, to tell the life story of a particular scientist, likely in most circumstances to be only one of many major contributors. But this is an unusual case for two reasons. First, the scientist in question has been, indeed still is, central to the field to an unusual extent. Second, this world-renowned scientist is a woman.

The book is based on a series of interviews with Elizabeth Blackburn, her colleagues, collaborators, and "competitors." One thing that comes across clearly is that Blackburn most probably would not use the last of these three terms. She shines through as someone who views biological science as a co-operative venture, rather than a race for recognition, the primary aim being to discover how organisms work. Highly driven to succeed in this, other scientists working on the same questions are seen more as companions than competitors. The book begins with a quick summary of her early life in Tasmania. Much of her early education was female-friendly, time well spent in an all-female school and undergraduate college, the latter at the University of Melbourne. We get, albeit a somewhat hazy, picture of a quiet, determined and scholarly person, interested in books and biochemistry. Blackburn did a PhD at Fred Sanger's Laboratory of Molecular Biology at Cambridge UK, where she encountered some of the major figures in the then emerging science of molecular biology. There she also met her future husband, at that time a *post-doc* in Sanger's lab. Interestingly, this book tells us nothing of substance about Blackburn's married life, or about her husband and his research, or the son that they later had. We get to know of their existence and their names, but hardly anything more. Although presumably this is to protect their privacy, it is in some ways a pity since it would have been interesting to hear from them how they found life with a wife and a mother who simultaneously managed to be an eminent scientist. We hear only a little about the influence of Blackburn's mother, who in her early life was "the only one whom I wanted to be proud of my achievements" (p. 35).

After her PhD, Blackburn followed her husband to Yale in the US. There the story of her scientific career almost came to an end, since at first she did not have a position of her own, and could easily have dropped out of research at that point (as all too often happens still). However, she was taken on by Joe Gall, a cell biologist and great advocate of women in science. Gall set her on the path to become the leading light in research on telomeres and telomerase. Although obviously a highly motivated researcher, with strong views and great abilities, Black-

burn started her scientific career at a time when things were more difficult for women than they are now. Long hours spent in the lab, while exciting, made outside life more difficult to manage. She survived perhaps because she ignored the gender issues that surrounded her, kept her head down, and got on with the work. "I disguised myself as a man" she says (p. 256). But the gender issues did touch her. Despite her international renown as a researcher, she still had to jostle for space and facilities, sometimes losing out to the prevalent and overpowering alpha male phenotypes. She also had to Chair her department, a role to which her personality, it seems, was not suited.

Brady charts the development of Blackburn and her work in Yale, then California, and also describes the development of telomere biology as a major area of fundamental molecular and medical biology. Continually, we get the impression of Blackburn as a curiosity-driven researcher, wary of being sucked into too much applied research despite the tantalizing funding opportunities offered. Money with strings was not for her. Blackburn also came to appreciate that it was not necessary to be physically present in the lab at all hours to make major advances; time clocked up in the lab is in itself not a good index of commitment or achievement. The final chapters of the book deal with Blackburn's brush with politics, when she joined George Bush's Bioethics Council in 2001, only to be dismissed in 2004 because she would not go along with a biased presentation of scientific evidence. This, and the subsequent publicity that surrounded it, forced Blackburn to engage with the politics that surround how science is used, and how scientists and their results can be manipulated to suit predetermined government policies. These final chapters also give us a bit more detail on the problems Blackburn faced and on how she feels now about gender issues in science. The field of telomere biology is marked by the relatively high number of women who have made major contributions. Blackburn as a role model and mentor must have played a major factor in enabling this to happen.

Overall, I certainly enjoyed this book. It provides an illuminating account of the career of a major figure in biology, and of the interesting combination of ability and vulnerability, self-doubt and self-assurance in Blackburn's personality. Brady does not shy away from frank discussion of the difficulties experienced by women in science. However, and going back to my first paragraph, it is not entirely clear to me to what audience the book is aimed. The biology, if clearly explained, is nonetheless too complex for nonbiologists, but this occupies a large part of the book. For active scientists, some of the descriptions of research structures and operations will seem too obvious. Throughout the book, the bits I liked best, and which gave me most food for thought, are often direct quotes from Blackburn herself. I found myself wishing for an autobiography. Perhaps, one day, it will come.

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The Rape of Troy: Evolution, Violence and the World of Homer. By Jonathan Gottschall. xii+223 pp. New York: Cambridge University Press. 2008. $99.00 (cloth), $34.99 (paper).

Nearly a half-century after publication of *The Two Cultures*, C. P. Snow's renowned lament remains regrettably apt. Indeed, anthropology has been especially convulsed by conflicts between devotees of science and of social constructionism, and sadly, it is not at all clear that a peaceful resolution is near. In *The Rape of Troy*, Jonathan Gottschall adds a third dimension to the dichotomy, applying sociobiology to literary narrative (specifically, the Homeric epics), and the result is stunningly successful.

Gottschall writes from "the conviction that the *Iliad* and *Odyssey* are not 'merely' stories, but troves of important social and cultural artifacts from a lost age, fossilized in dactylic hexameter, and available for careful excavation" (p. 25). Evolutionary lit-crit is an approach that he and others have been pursuing of late (Barash and Barash, 2005; Gottschall and Wilson, 2005), and it works—at least in my biased opinion, and especially well in Gottschall's capable hands. The result is an extraordinarily productive new look at ethnography and literature, through a distinctly Darwinian lens.

Gottschall's goal in this book is to analyze "Homeric conflict from the perspective of modern anthropology and evolutionary biology," arguing, first, that such conflict results from "direct attempts, as in fights over women, or indirect attempts, as in fights for social status and wealth, to enhance Darwinian fitness in a physically and socially exacting ecological niche" (p. 3). The trick is to look at what Homer's characters *do* (and the impact of such actions on their inclusive fitness, which is to say, the potential immortality of their genes) and not just what they *say*—dilating about honor, glory, and immortality that is merely symbolic.

Second, and of equal likely interest to anthropologists, Gottschall shows that "patterns of violence in Homeric society are tantalizingly consistent with the hypothesis that Homeric society suffered from acute shortages of available young women relative to young men" (p. 4), thereby resurrecting and giving added credence to the thesis of Divale and Harris (1976), that warfare among nontechnological people has been driven by a relative shortage of women. Finally, he seeks to "illuminate the . . . oppressive miasma of fatalism and pessimism that pervades the *Iliad* and, to a lesser but still palpable extent, the *Odyssey*" (p. 4). Toward this end, game theory is creatively invoked.

I don't know if Gottschall is correct—although I suspect he is—but I do know that he makes a powerful case, linguistically no less than logically; indeed, his account of "Homeric tragedy" rises to a level of sanguinary poetry that might make Cormac McCarthy envious.

Despite the potency, even fervor, of his argument, Gottschall is clear about its limitations: "to explain human conflict at the evolutionary level is not to reduce or slight its distinctively human grandeur, horror, or complexity; it is not to demote social and cultural influences that are equally important, and it is not to sanction a grim view of the human capacity for change" (p. 9). What it does sanction, and I would think, impel, is a new way for anyone interested in "human biology" to understand what makes *Homo sapiens* tick . . . and especially, fight.

I have a few complaints, however. Gottschall pretty much equates sexual selection with male–male competition, giving only minimal attention to epigamic selection ("female choice"). Moreover, female–female competition goes unmentioned, yet it also rears its not-so-subtle head throughout the Homeric epics, notably involving Hera, Athena, and Aphrodite, presumably as surrogates for the real thing. As to male–male competition for females and its relationship to nontechnological warfare, I looked in vain for mention of William Durham's (1976) masterful early treatment.

Gottschall's enthusiasm sometimes leads him to excesses of purple prose and metaphoric overkill (e.g., "On the horizon, for the person hearty enough to swim the rapids, scale the cliffs, and find and negotiate the snowy passes, one can just make out a land of gentle hills and fertile plains, representing the reward of reproductive success—the only thing that really matters in evolutionary terms" p. 102). He and his readers would have been well served by attention to the increasingly understood phenomenon of "extra-pair copulations" (Barash and Lipton, 2002), something that Homer's contemporaries apparently knew quite well, and acted upon with relish. There is only cursory attention—in a single endnote—to the important theory of selection for parental ability to vary offspring sex ratio (Trivers and Willard, 1973), a matter that deserves more consideration given its Homerically relevant prediction that lower socioeconomic class families should have been biased toward daughters, while upper-class families would have preferred sons. The latter evidently occurred, but what about the former?

Finally, Gottschall's claim that "female shortage" contributed significantly to Homeric warfare may be valid, but is presented as a contradiction: that male-biased sex ratio results in heightened male–male competition, but also that a purportedly skewed sex ratio would somehow be exaggerated by high rates of adult male mortality—whereas if anything, such male-biased mortality would reduce the skew, not enhance it.

But enough griping. *The Rape of Troy* is, above all, a brilliant little book—so brilliant that I wish it were less little. It crackles with intellectual vigor, academic rigor, and the prospect of triggering a revolution in research at the intersection of anthropology, biology, and literature. Even the Acknowledgment section is worth reading, especially for the author's invocation of the fate of Thersites, who, after notoriously railing against the Greek kings, was mercilessly beaten for his impolitic presumption:

> "When entering into discussion of 'Homeric questions,' one finds oneself among 2,500 years' worth of scholarly heroes, and one is exposed to the very real possibility of being—metaphorically speaking—stripped naked, flogged brutally, and reduced to an object of derision: the bolder the argument the greater the risk. The dangers are enhanced in my case [writes Gottschall] by the massively interdisciplinary nature of my undertaking, which has obliged me to attempt to master not only relevant aspects of the truly vast corpus of Homeric scholarship, but also daunting literature in comparative anthropology and evolutionary biology. Time will tell whether I will suffer the fate of Thersites and be whipped from the assembly of scholars, or whether I will be offered a seat there."

There is simply no doubt. Gottschall deserves a seat, moreover, one of honor.

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