

Review

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cept of parsimony, or “Morgan’s Canon,” in evolutionary biology and comparative psychology. Essentially, is it more parsimonious to assume that we share a mental trait, say, with chimpanzees, because that trait was conserved over evolution, or is it more parsimonious to assume that a chimpanzee’s thinking is different from, and simpler than our own, until proven to the contrary? Juxtaposed, as they are in the book, these two essays form an extended meditation on the desire for, and difficulty of, obtaining rigor in the life sciences. Taken together, these chapters offer at least one explanation for humanity’s universal and ancient obsession over thinking with animals: at once like us and unlike us in so many ways, animals can highlight the most serious challenges to understanding ourselves.

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**NUTRITIONAL GENOMICS: IMPACT ON HEALTH AND DISEASE.** *Based on a colloquium held in Hanover, Germany, 1–3 April 2004.*

*Edited by Regina Brigelius-Flohé and Hans-Georg Joost. Weinheim (Germany): Wiley-VCH Verlag. \$125.00. xxviii + 442 p; ill.; index. ISBN: 3-527-31294-3. 2006.*

Nutritional genomics, or nutrigenomics, is the study of how foods affect the expression of genetic information in an individual and how an individual’s genetic makeup metabolizes and responds to nutrients and bioactives. Although this field is considered to have started with the completion of the sequencing of the human genome, the connection between food and health has been known for millennia. Modern biological technologies are allowing the detailed analyses of how chemicals in food alter genetic expression and how metabolism of nutrients may differ among each individual. The concepts, experimental designs, and technologies that are employed to examine gene-nutrient interactions are well described in the volume *Nutritional Genomics: Impact on Health and Disease*.

The book is separated into three parts: an excellent introductory chapter that describes definitions, tools, and concepts, and then sections on nutrigenomics (nutrient-gene interactions) and nutrigenetics (nutrient-genotype interactions). The 11 chapters in the part on nutrigenomics may best be called “molecular nutrition” since the focus is primarily on very detailed and comprehensive descriptions of nuclear receptors regulated by nutrients and those that control the expression of nutrient-metabolizing genes. Future descriptions of these receptors will likely include data that does not yet exist: how polymorphisms in these transcription regulators alter nutrient-receptor inter-

actions, their binding to the promoters of the genes they regulate, and the subsequent changes that may explain interindividual variation. Chapters in this section focus on how the involvement of these receptors function in atherosclerosis, cell differentiation, diabetes and the metabolic syndrome, and obesity. Two chapters are devoted to topics not generally described in nutrigenomics reviews: selenoprotein expression and protein synthesis. Part III focuses on nutrigenetics—the study of the association of variants of candidate genes with metabolic disorders, specifically type 2 diabetes, obesity, inflammation, hypertension, and cancer. Variation of taste receptors and the gene variants responsible for metabolizing dietary xenobiotics are also described in separate reviews.

Much of the research reviewed in these chapters was developed or in progress before the field was christened “nutritional genomics.” Only recently has funding been available for research in the broadly defined area of nutritional genomics. This volume will be a valuable resource for the field by providing descriptions of the existing knowledge and directions for future nutritional genomics research.

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**MORE THAN KIN AND LESS THAN KIND: THE EVOLUTION OF FAMILY CONFLICT.**

*By Douglas W Mock. Belknap Press. Cambridge (Massachusetts): Harvard University Press. \$16.95 (paper). xix + 267 p; ill.; index. ISBN: 0-674-01285-2. 2004.*

**A NATURAL HISTORY OF FAMILIES.**

*By Scott Forbes. Princeton (New Jersey): Princeton University Press. \$27.95. xiii + 231 p; ill.; index. ISBN: 0-691-09482-9. 2005.*

In 1974, Robert Trivers published a compelling analysis of the relationship between parents and their sexually produced offspring. His basic insight can be summarized in a few words. From a parent’s perspective, the young of equal potential are equal in their expected contributions to parental fitness and, hence, equally worthy, but from a focal offspring’s perspective, a sibling is never as worthy as self. Intrafamilial conflict over resource allocation is thus inevitable. This theory was one of the elegant contributions for which Trivers was recently awarded the Crafoord Prize, but how have scientists made use of it? That is the subject of these two volumes.

Douglas Mock is a behavioral ecologist best known for his work on siblicidal egrets, and birds provide most of the examples in his engaging exposition on sibling rivalry and parental investment strategies. Written for a general audience, his book

lacks the depth that some biologists might wish for. For example, there are no data figures and the game theoretical approach that was featured in Mock and Geoffrey Parker's 1997 monograph, *The Evolution of Sibling Rivalry* (Oxford (UK): Oxford University Press), is minimally sketched. Nevertheless, the present volume is good value. The dedication to Mock's three older brothers, with an accompanying photography, is priceless, and topics such as obligate and facultative siblicide, brood parasitism, the sources of conflict between mates, and the several theories vying to explain the evolution of brood size are treated both entertainingly and with admirable clarity.

Although Mock credits Trivers appropriately, and even quotes Einstein to the effect that theory determines what we can observe, his conclusion strikes a somewhat different tone: "A hunch that has been formalized as a mathematical model is still just a hunch" (p 228). Perhaps so, but readers may come away from this book with the wrong message, namely that the theory of parent-offspring conflict has not delivered on its early promise. Mock himself says that he can think of only two "biological features [both, as it happens, in insects] that almost certainly evolved in response to parent-offspring conflict" (p 170). Strangely missing from this very short list are David Haig's compelling explanations of a myriad of otherwise baffling facts about maternal-fetal interactions in mammals as the intelligible products of Triversian arms races.

Scott Forbes is also a behavioral ecologist who has done empirical and theoretical work on brood reduction. He did postdoctoral research with Mock, so it is no surprise that his monograph should cover many of the same topics. But Forbes's volume is wider ranging and more ambitious. Unlike Mock, Forbes has a great deal to say about mammalian pregnancy, exploring the implications of the Trivers-Haig world-view for topics such as spontaneous abortion, multiple births, imprinted gene effects, and disease. Forbes has original ideas about these matters that will excite controversy, partly because he is willing to make rather snarly remarks about politically sensitive topics such as assisted reproduction, but also partly because some of his ideas are highly speculative. For example, one that raised my eyebrows was a proposal that imprinted gene expression may be "relaxed" in older mothers (p 107); surely there are more likely mechanisms by which maternal investment is adjusted with age?

Forbes's book is stimulating, but it would have benefited from more careful editing. It is sometimes elementary and at other times pitched much higher; it has a referencing system that will be more congenial to scholars in the humanities than

to scientists; some figures convey little or nothing; and a couple of topics are revisited in such a way that the first time around seems to presuppose the second. However, the quality of the writing is better than the editing—with wit, style, and plenty of apt allusions to history and myth. And if some conclude from reading Mock's book that parent-offspring conflict theory has been a bit of a flop, reading Forbes's volume should set them straight.

A Crafoord Prize for great field work may be overdue (I nominate Peter and Rosemary Grant). But Trivers deserved his prize, too.

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#### BIOMEDICAL SCIENCES

BATTLE OF THE GENOMES: THE STRUGGLE FOR SURVIVAL IN A MICROBIAL WORLD.

By *H M Lachman*. *Enfield (New Hampshire): Science Publishers*. \$29.95 (paper). xx + 334 p; index. ISBN: 1-57808-432-6. 2006.

The author seems to have had two or three books in his head, and they all have spilled onto the pages of this publication in a way that is informative and engaging, yet so often discursive that readers will occasionally lose the central theme of the discussion. The volume is at once a history of medical microbiology and infectious disease, a history of immunology, and an overview of the intersection of those fields with genetics. Infection is not often treated as a phenomenon that has a genetic component, so the approach is notable; and it is more notable—even laudable—that an evolutionary perspective pervades much of the narrative in a book presumably intended for nonspecialists. I say presumably because this volume includes no statement about its intended audience, and the nature of the content makes it difficult to discern for whom the author was writing. Some of the material is appropriate for the general public as well as students in introductory biology courses for nonmajors, while other content requires prior exposure to basic concepts in genetics and cell biology.

The "battle" in the title is that between the genomes of infectious organisms and those of their various hosts and vectors, with a focus on *Homo sapiens*. For example, chapters on cholera, malaria, smallpox, and typhoid fever illustrate the various genetic mechanisms that microbes exploit to make of us their meals, and Lachman reviews those well-known situations in which human genes have or