

various kinds of evolutionary approaches to "the human sciences" are related to each other. Even if the volume were as ambitious as its grandiose title implies, it would still have to be remarkably successful to justify its extraordinary price. But it is neither encyclopedic nor exceptional. Instead, it is a typical, edited collection of disparate personal views, in this case by nonbiologists who apply evolutionary thinking to areas from social learning and cognition to language, society, morality, politics, economics, and epistemology. For biologists, the result is alternately eye opening and frustrating. For example, a chapter on language evolution (by Haarmann) is an engaging overview of the diversity of languages and their relationships, but is essentially mute about the mechanisms of change. Tomasello's essay on the way in which recognition of others as intentional agents changes the capacity for cultural learning is a logical and empirical gem, but it is a reprint of a four-year-old article whose conclusions have already been extended by new experimental results. Meyer, a sociologist, structures his chapter on social evolution around the notion that it is time to incorporate inclusive fitness thinking. He makes his case well, but even in a dense 40 pages he can do little more than stress the principle, and this he does for the sake of his fellow sociologists rather than biologists.

In general, this volume is intended more for social scientists than for biologists. Their engagement with evolutionary theory is (in principle) promising, but *Handbook of Evolution* shows there is a long way to go.

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ANNUAL REVIEW OF GENOMICS AND HUMAN GENETICS. *Volume 5: 2004.*

*Edited by Eric Lander, David Page, and Aravinda Chakravarti. Palo Alto (California): Annual Reviews. \$79.00. xi + 544 p + 33 pl; ill.; subject index and cumulative indexes (contributing authors and chapter titles, Volumes 1-5). ISBN: 0-8243-3705-0. 2004.*

EVOLUTION ILLUMINATED: SALMON AND THEIR RELATIVES.

*Edited by Andrew P Hendry and Stephen C Stearns. Oxford and New York: Oxford University Press. \$85.00. x + 510 p; ill.; index. ISBN: 0-19-514385-X. 2004.*

The objectives that the editors laid out for this book were "to inform evolutionary biologists about the wealth of information on salmonids that bears directly on evolutionary questions" and "to

increase awareness among salmon biologists of the relevance of their data for key issues in evolutionary biology. Through improved communication we hope to advance both fields" (p 4).

The book has succeeded brilliantly in meeting its objectives. A topnotch group of authors mostly from the U.S., Canada, and Norway, but including contributors from France and Sweden, thoughtfully cover a broad array of topics that range from the more theoretical (e.g., evolution of egg size and number by Einum et al.) to the practical (e.g., conservation units and preserving diversity by Ford). The depth and breadth of coverage in the chapters is excellent. Each provides a comprehensive review of the basic concepts, then marshals the evidence for and against the existing theoretical frameworks. Information from many disparate sources is pulled together and synthesized to extract general patterns.

It is the evolutionary theme that unifies the chapters, and makes the biggest scientific contribution. The 13 chapters cover a broad array of current issues (e.g., adaptive radiation by Bernatchez; life-history evolution by Hard; breeding systems by Fleming and Reynolds; and evolutionary inferences from natural hybridization by Taylor) and provide an understanding of documented or possible processes that control the abundance of salmonids. This is of clear interest to evolutionary biologists, ecologists, and managers of salmonid populations.

Three excellent appendixes supply ample reviews of straying rates of anadromous salmonids, genetic differentiation among conspecific salmonid populations at nuclear DNA loci, and differences between anadromous and nonanadromous salmonids. These are very useful quick reference sources.

The book is well laid out and cleanly printed. A number of pleasing line drawings of different salmonids have been included at the beginning of each chapter. The formatting of the chapters is a bit inconsistent. Some provide summaries, but most do not. Many of the authors took pains to outline what they considered to be productive future research questions or areas, whereas others omitted this information.

It should be noted that this is a volume primarily about wild salmonids, and steers clear of the issue of commercial salmonid farming. It is an excellent source of suggestions for future graduate student research projects and will be a useful reference for professionals that work in the field. It also provides quick answers to many questions frequently asked by journalists on tight deadlines. It will be a great book for use in graduate courses on evolution or

fish biology. At its list price, the volume is a bargain.

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#### THE EVOLUTION OF POPULATION BIOLOGY.

*Edited by Rama S Singh and Marcy K Uyenoyama. Cambridge and New York: Cambridge University Press. \$120.00. xxix + 460 p; ill.; index. ISBN: 0-521-81437-5. 2004.*

This is the third volume of a massive festschrift (over 1786 pages) honoring Richard C Lewontin of Harvard University. [The first volume, *Evolutionary Genetics: From Molecules to Morphology*, was reviewed in the *QRB* 76(3)2001:351.] There has always been a certain magnetism in Lewontin's challenging approach to biology. When invited to write for these volumes, most authors have replied in kind, with articles that are frank and uninhibited. Rama Singh, who has served as senior editor of all three books, has handled these extraordinarily diverse manuscripts with discretion and forbearance.

As the title of this latest volume boldly suggests, a new science ("population biology") may be evolving due to voluminous new molecular data on genetic variability and the discovery of intergenic action networks. Especially relevant are increasingly realistic models of the fate of genetic variations in populations. For this volume, Lewontin has again contributed an introduction. His approach here is wholly new: he boldly stretches minds, offering an account of what an integrated model-based biology of populations might be like. With characteristic verve, however, he issues a warning: "contemplation of the bulk of these models quickly reveals a characteristic of 'population biology' as a science—its nonexistence" (p 7).

The editors have recruited seminal articles from leaders in various aspects of population study. Each tends to jump into new complexities with little condensation to the uninitiated. Of the 22 articles, the first 13 are particularly relevant to the book's title. Among the contributors are Levins (models), Mackay (genetics of quantitative traits), Hartl et al. (gene expression profiling), Singh and Morton (evolution of genetic systems), Christiansen (density-dependent selection), Gillespie (rates of adaptive evolution), and Charlesworth (genetics of life-history evolution). The remaining nine articles present case studies of evolution, including a rich account of the emerging field of conservation biology (Hedrick). The book concludes with contributions by Cavalli-Sforza and Provine on human genetics and evolution. Lewontin suggests that a formal population biology is nonexistent. Nevertheless, he would agree that advances raise new

exciting possibilities. Thus, we may be finally seeing the way to a realistic account of the mode of origin of permanent, genetically based adaptations—the essence of the evolutionary process.

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#### GENETIC STRUCTURE AND SELECTION IN SUBDIVIDED POPULATIONS. *Monographs in Population Biology, Volume 40.*

*By François Rousset. Princeton (New Jersey): Princeton University Press. \$79.50 (hardcover); \$39.50 (paper). xvi + 264 p; ill.; index. ISBN: 0-691-08816-0 (hc); 0-691-08817-9 (pb). 2004.*

In this volume, the author reviews one-locus and two-locus haploid mathematical models for describing genetically structured populations and presents simplified derivations of a number of results from diffusion approximations. The emphasis is on the probability of identity by descent and the combined effects of selection and random drift on the probability of fixation. The approach is applied to a variety of topics where these two evolutionary forces interact, including social evolution, inclusive fitness theory, and game theoretical models. Although the models are highly simplified (e.g., most use haploid genetics) and the more difficult parts of the derivations are placed in chapter appendixes, most evolutionary biologists will find this book to be rough going.

The author's central question is whether the genetics of metapopulations behave like the classic Wright-Fisher model of single-locus selection and random drift, when a range of appropriate biological complexities (such as age structure, separate sexes, social structure, and spatial and temporal fluctuations in deme size) are properly accounted for. The answer is "yes" with few exceptions, although novel results of the past 15 years from two-locus theory (such as the conversion of epistatic to additive variance by drift and selection) are not treated. I found the highlights of the book to be the chapter on effective population size, which is illuminating and comprehensive, and the final overview and perspective chapter, which argues forcefully for a better appreciation of the limitations of the models in the analysis and interpretation of data. Here, Rousset points out that many mistakes are made when empiricists apply equilibrium genetic theory to poorly defined natural populations. He warns, in general, that effective population sizes cannot be estimated with much precision from gene or sequence diversity data.

I recommend this book for theoretical population geneticists, and anyone applying theory to