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Book reviews

Intelligence, Genes, and Success. Bernie Devlin, Stephen E. Fienberg, Daniel P. Resnick and Kathryn Roeder (eds). Copernicus (Springer–Verlag), New York. 1997. Pp. 376. Price £19.00, paperback. ISBN 0 387 94986 0.

When you saw this title you probably groaned and thought, 'Not another commentary on *The Bell Curve*!'. There are at least three other edited books as well as two authored volumes and many hundreds of articles commenting on Murray and Herrnstein's 1994 book. However, this book is somewhat different in that it tries to focus on science rather than politics and to attempt to provide an integrated response that encompasses the diverse topics raised in *The Bell Curve. Intelligence, Genes, and Success* includes sections on genetics and intelligence, the measurement and utility of intelligence, the relationships between intelligence and social outcomes (earnings, education, and crime), and public policy. Many of these topics involve statistical issues and the authors indicate that the volume 'is particularly designed for quantitative readers who want to gauge for themselves the soundness of the statistical argument'.

Intelligence, Genes, and Success is somewhat critical of *The Bell Curve* in relation to genetics and intelligence, less so concerning the measurement of intelligence, more so for the relationship between intelligence and social outcomes, and especially so in terms of policy implications. The book begins with a 20-page chapter written by a former student of Richard Herrnstein who provides a nonjudgmental summary of the *The Bell Curve*. This was a good idea because, judging from some previous commentaries, *The Bell Curve* may be one of the most discussed but least read books around.

The area that I know best and the one most relevant to this journal is genetics, although the origins of individual or ethnic differences are not critical to *The Bell Curve*'s argument about the phenotypic relationship between intelligence and class structure. *Intelligence, Genes, and Success,* has three chapters in a section on 'The Genetics-Intelligence Link'. A chapter by Daniels, Devlin and Roeder provides a meta-analysis of family, twin and adoption data on IQ that estimates narrow heritability as 34% and broad heritability as 48%. Broad heritability includes nonadditive as well as additive genetic variance; nonadditive genetic variance has been found in genetic analyses of IQ that take into account assortative mating, which is far higher for IQ than for other behavioural traits. Because nonadditive genetic variance does not breed true, parent-offspring resemblance, which is the basis for *The Bell Curve*'s argument about the creation of a 'cognitive elite', is limited to narrow heritability. However, it is remarkable that the boundaries of the argument now are whether the heritability of IQ is 30% or 70%. Not much would seem to follow from finding that the heritability of IQ is 30% rather than 70%. In particular, it would have little effect on the arguments in *The Bell Curve*, although the authors argue that their finding of maternal effects holds out hope for perinatal environmental intervention. The effect that they label as a maternal effect is based on the greater IQ similarity of twins than non-twin siblings. There are problems with this model, most notably, mother-offspring and father-offspring IQ correlations do not differ.

The book is engagingly written and well organized with integrative summaries at the beginning of each section and a good summary chapter by Resnick and Fienberg.

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Asymmetry, Developmental Stability, and Evolution. Anders Pape Møller and John P. Swaddle. Oxford University Press, Oxford. 1997. Pp. 291. Price £19.50, paperback. ISBN 0 19 854894 X.

This book, and its associated web site (http://www.oup.co.uk/MS-asymmetry), is concerned with developmental instability and in particular its most frequently measured phenotypic manifestation, fluctuating asymmetry (FA). FA has a long scientific pedigree but its recent use in shedding light on the performance of animals, sexual selection and fitness has led to a revival of interest. FA is relevant to human studies in these fields and therefore offers a real opportunity for advancement in evolutionary psychology and medicine. Add to this the recent realisation that FA has predictive power in many fitness domains such as speed and manouverability, immune status, fertility and longevity, and we can appreciate the intellectual excitement of believers and the incredulity of the sceptics.

Møller and Swaddle have weighted this book towards the established science. They carefully discuss why asymmetry is one manifestation of developmental instability, how it is linked to evolutionary biology and how it develops in individuals. Genetic and environmental variables which may cause asymmetry are discussed together with the important and difficult topic of heritability of FA. All this takes six chapters. Scientific respectability established, they address the topics of performance, signalling and fitness. It is in these last three chapters that a sense of progress is generated. With this excitement comes real differences of opinion as to whether FA is important mechanically or does it reveal metabolic differences in efficiency, is it a ubiquitous signal in display traits and weapons or merely an indication of their functional effi-

ciency, and can it really have relevance to almost every fitness domain? It is in answers to these questions that the importance of FA lies. If it is correlated with basal metabolic rates and VO_2max and/or if it is associated with immune status and the production of efficient sperm and eggs, then the excitement is justified. The next two years should ensure that the authors' last three chapters will require expansion into another book.

Throughout the book the authors discuss these topics with authority. Møller in particular is noted for his prodigous productivity in this field, a fact which may be confirmed by a glance at the Author Index. The work of all the main players in the game is acknowledged and discussed in an even-handed way. The chapters are written as self-contained units and can be dipped into independently. So if you work on FA keep this book in your laboratory — it cites references which you have not read — or, if you are thinking of incorporating FA into your research, read it before you start.

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Evolution on Islands. Peter R. Grant (ed.). Oxford University Press, Oxford. 1998. Pp. 334. £24.99, paperback. ISBN 0 19 850171 4.

I welcomed the opportunity to review this book, as it arose when I was in the final stages of coediting a multiauthor volume on *Biogeography and the Geological Evolution of SE Asia* (Hall & Holloway, in press) that explores the potential for biogeography to help elucidate the geological history of the complexity of islands from SE Asia out into the Pacific, and also the role that increasingly detailed geological evidence of the evolution of the area can play in promoting understanding of observed biogeographic pattern. Unfortunately our introductory remarks had to be put to bed before I had finished *Evolution on Islands*, as many of the chapters continued to stimulate ideas and refinements for many of the topics we touched on.

Historical biogeographers are currently in danger of falling between two stools. In a series of laudable attempts to establish methodology for pattern recognition that is objective and free of circularity, they have put to one side most considerations of biological process. This has led a number of them to focus on deriving from biological phylogenies a unique phylogeny, in tree form, of areas wherein Earth history is encapsulated. This approach does not hold much attraction to geologists, particularly when they note a parallel tendency to attach low value to evidence from fossils and from molecular clock data. Both are subjects of fierce debate in historical biogeography, and are referred to in many places in *Evolution on Islands*. The ability to date events is seen as critical by geologists unravelling Earth history. Historical biogeography, by turning away from process questions and eschewing promising, if imperfect, means of dating, may lose the interest and input of both evolutionary biologists and geologists and be left to feed mainly on itself. A salutary reading of *Evolution on Islands* by historical biogeographers might help redress this and open some eyes to areas where too rigid a methodology for pattern analysis may run astray, particularly in the potential for conflict between morphological and molecular evidence, with hybridisation and introgression tending to fan the flames of that conflict. The influence of climate, in conjunction with ecology, on morphology and on changes in biogeographic pattern is also evident in several chapters, but frequently ignored in historical biogeography.

In our introductory chapter, we have suggested that historical biogeographers should rekindle an interest in process questions, and we explored prospects for modelling or simulating pattern development in island systems using current hypotheses of process in island biogeography as input. I would certainly add *Evolution on Islands* to the essential reading list for anyone attempting such a challenging task: indeed it focused my mind more clearly on both the potential and the pitfalls.

The book defines islands in a very broad sense, addressing not just evolution on land in a water matrix, but also in water (lakes) in a land matrix and over mosaics of vegetation 'islands' in the gross continental setting of tropical S. America. It is therefore able to bring together reviews of classic studies on drosophilid flies, finches, partulid snails, anole lizards, lobelioid shrubs and viper's bugloss from Hawaii, the Galapagos, Macaronesia and the Caribbean, with chapters on fish evolution in postglacial lakes in N. America and in the rift lakes of Africa, and two that examine and challenge hypotheses of island-like glacial refugia of forest and savannah in S. America.

Not all chapters are concerned with instances of explosive speciation. Several focus particularly on a theme running through the book, the disentangling of stochastic and deterministic factors in evolution on islands, such as the founder effect and genetic drift vs. adaptation and selection, and the extent to which the influence of these differs between small and large islands and in comparison with mainland source areas. Several chapters discuss gross biological differences over this spectrum of island size and in relation to isolation for organisms of different size and basic biology.

The chapters are divided into three sections, each with an informative introductory chapter by the editor to place them in context: patterns on islands and microevolution; speciation; radiations, communities and biogeography. For someone such as myself who is not primarily an evolutionary biologist or geneticist, these contextual sections were extremely helpful and ensured that the whole became more than the sum of its parts.

A final editorial 'epilogue and questions' chapter draws the threads of the three sections together and looks to the future. The vexed question of dating phylogenetic events

is, from an historical biogeographic point of view, one of the more outstanding questions. Geologists challenge biogeographers to find some biological means of dating, whilst biologists seek to calibrate molecular divergence against datable geological events. For the time being at least, we will have to shuffle forward by a careful process of reciprocal illumination!

The book is informally dedicated to Sewall Wright and Ernst Mayr, referring back also to the work of Alfred Russell Wallace. It continues their tradition of stimulus and challenge to evolutionary biologists (and, I hope, biogeographers) but ends on a note of urgency because human activity is leading to the disappearance or gross modification of the diversity of phenomena in evolution on islands. The time left for taxonomic inventory of such diversity, let alone the sort of detailed studies presented in the book, may be all too short. An acceleration of such work may be the best way to gain a stay of execution.

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Influential Passengers: Inherited Microorganisms and Arthropod Reproduction. Scott L. O'Neill, Ary A. Hoffmann and John H. Werren (eds). Oxford University Press, Oxford. 1997. Pp. 214. Price £22.95, paperback. ISBN 0 19 850173 0.

Influential Passengers is a slim, multiauthor volume about reproductive parasites — microorganisms which manipulate the reproduction of their hosts to enhance their own transmission. It is a truly excellent book, effortlessly providing both a clear introduction to the subject and an authoritative overview of current research priorities. Unlike many multiauthor volumes, a uniformity in approach and style is maintained throughout. The 11 contributors and editors are to be congratulated for producing a book that reads like the work of a single author with a remarkably broad grasp of the subject.

The introductory chapter (Werren & O'Neill) reminds the reader that the basis of reproductive parasitism is that most vertically-transmitted microorganisms are maternally inherited. This has the consequence that the fitness of the microorganisms is enhanced by increased female sex ratio, so generating an evolutionary conflict between the microorganisms and their host. This chapter sets the pattern for the book, combining a clear review of the subject with thought-provoking discussion of the evolutionary consequences of reproductive parasitism. The authors explain that reproductive parasites in arthropods may feminize or kill male offspring, cause their female hosts to reproduce parthenogenetically, or render sterile any crosses between infected males and uninfected females (i.e. mediate cytoplasmic incompatibility). They then address, head-on, the central problem of why so many maternally-inherited microorganisms apparently fail to distort host reproduction. Although the authors provide no definitive answers, this discussion provides just the right context for the following four chapters, exploring in detail cytoplasmic incompatibility (Hoffmann & Turelli), feminization (Rigaud), microbial-induced parthenogenesis (Stouthamer) and male-killing (G. & L. Hurst & Majerus).

Several common themes emerge from the four central chapters on each mode of reproductive parasitism. Foremost among them is *Wolbachia*, the small group of α-Proteobacteria that is responsible for most described instances of reproductive distortion; exceptionally, male-killing is mediated by a variety of microorganisms. Does the induction of parthenogenesis, cytoplasmic incompatibility and feminization by *Wolbachia* have a common genetical and molecular basis? Both the phylogenetic and cytogenetic evidence suggest they may have. Is the wide phylogenetic diversity of male-killing microorganisms a consequence of male-killing being a physiologically 'simpler' trait than the other modes of reproductive parasitism? G. and L. Hurst and Majerus suspect yes, but why? All the authors also make it clear that the low phylogenetic diversity of reproductive parasites is matched by the low diversity of their hosts, restricted to the insects, mites and Crustacea. Some modes of reproductive parasitism are even more limited in distribution: feminization to two groups of Crustacea, the amphipods and isopods (is the chromosomal sex-determination system of Crustacea really uniquely labile and, if so, why?); and *Wolbachia*-induced parthenogenesis to hymenopteran parasitoids, currently just 30 species (surely, it will be found to be more widespread, at least among haplodiploid species). Perhaps most eukaryotes have effective means to suppress the sex-distorting capabilities of maternally-inherited microorganisms. If that is true, then these reproductive parasites have contributed to the very architecture of sex determination among eukaryotes. The authors have some of the answers to the puzzling biology of reproductive parasites, but the editors have wisely encouraged them to raise and discuss some issues that they cannot resolve definitively.

The last chapter on the applied potential of reproductive parasites (Sinkins, Curtis & O'Neill) is an effective counterbalance to these discussions of genomic conflicts. Reproductive parasites have enormous potential in the control of insect pests, particularly vectors of animal or plant pathogens. If desired genes (e.g. for resistance to trypanosomes in tsetse flies or resistance to plant viruses in aphids) can be introduced to a maternally-inherited genome of these insects, *Wolbachia* can literally drive these genes through the vector population. The authors are aware that 'many years of research' will be needed before this approach can make any substantive practical impact on pest control. The research will require sustained funding, and this book provides the evidence

that the funding will be for a discipline based on excellent science.

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The Internet and the New Biology — Tools for Genomic and Molecular Research. Leonard F. Peruski Jr. and Anne Harwood Peruski. American Society for Microbiology (Blackwell Science), Oxford. 1997. Pp. 314. Price £21.50, paperback. ISBN 1 55581 119 1.

It was always going to be a difficult task to write a book that deals with the rapidly-evolving internet. The main problem with the internet is that web services that existed yesterday might not be around tomorrow. A publication like this takes a little time between when it is written and when it comes into print and so it will always run the risk of being out-of-date on the day it is published. While the Peruskis have produced a sizeable tome that deals with a lot of the available internet services, it does suffer slightly from being out-of-date. In an attempt to counteract this potential shortcoming, the book is supplemented by a website provided by the publishers ASM press. In order to log in to the website, you need a password which is printed in the book.

This large-format paperback is clearly and intelligently laid-out. There is an extensive use of highlighted areas and bullet-pointed paragraphs. The descriptions of each internet service follow a common format that is easy to follow, with the most salient points being clearly identifiable. In addition to providing information about accessing each internet service a real example is also provided, and this is certainly useful.

A few years ago, much of the molecular sequence data analysis was being carried out on desktop computers. For many laboratories the prospect of buying a parallel-processing computer was simply not an option. Databases were being distributed on compact discs and database searches were frequently carried out overnight. This all changed a few years ago with the advent of rapid internet connections and the virtual epidemic of free internet services being provided by large institutions around the world. Perhaps, then, it is timely that a book should be produced that attempts to collate all of this information and present it to the reader in a unifying format.

Chapter 1 introduces the reader to the internet, its history, its relationship to biological research and how the book is going to deal with the subject. In the authors' words, the book focuses on 'E-mail servers, Gopher servers and the emerging World Wide Web'. Personally, I haven't used a gopher server for some time. Although they were quite useful some years ago, it must be said that the gophering-era is all but over. It was at this point that I began to see the difficulties of trying to write this book. Chapter 3 is an invaluable chapter for the absolute beginner. It is full of titbits of information that are essential to know before attempting to navigate through the rest of the book. Chapter 4 introduces us to the most commonly-used databases and their attributes.

Despite earlier references to internet protocols such as gopher and the World Wide Web (WWW), almost all of the information in the main analysis sections of this book deal with sending properly-formatted E-mail messages to E-mail servers. While this approach is quite sensible, its failure to tackle the extensive range of WWW services on offer is a real shortcoming of the book. There are many instances when an E-mail server is preferable to a WWW server, particularly during peak hours or in parts of the world where connection to remote servers is quite slow. However, when presented with the option of accessing data through a web browser or through an E-mail server, most researchers will usually plump for the former.

From chapters 5 to 9 we start to get an idea of what kinds of information can be found on the internet. Chapter 5 is split into two sections covering database search services and sequence retrieval. This chapter will probably be the most useful for the majority of researchers. There are highlighted areas that, at a glance, can give the researcher a very good idea of what a properly-formatted E-mail message should look like. The various options are easy to identify and are explained in enough detail to make it an easy task to modify successfully any request. The theme is continued in chapters 6, 7 and 8. The book ends with a list of helpful web addresses and a commentary on the prospects for the future relationship between biology and the internet.

The book is designed as a primer for the neophyte molecular biologist. All of the information contained here is probably available in one shape or form on the internet. The authors say that the motivation for writing this book was so that other researchers would stop asking them the same questions over and over again. It is a good book and I think every lab. should have a copy, both as a teaching aid for new biologists and also as a tidy reference manual during the analysis stages of a project. Unfortunately, it doesn't deal with the more recent developments in sequence analysis on the web. The web is almost completely ignored and for labs with fast internet connections, it is unlikely that researchers are going to take the time to format E-mail messages when it is so much faster to perform these analyses using a web browser.

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