

migration, inbreeding/outbreeding and conservation particularly useful and detailed. Several of these chapters, for example Pemberton *et al.*, really do place some classical field studies in a new context, promising useful tools for investigating hitherto intractable problems in natural populations. While those sections on microsatellite diseases and the role of microsatellites in mapping disease-associated regions within the human MHC may have a rather more limited audience they nevertheless provide a fascinating view of the medical consequences and utility of these repetitive regions. The discussions of reconstructions of human populations and the forensic applications are gripping and well-written, and the application of population and phylogenetic approaches to the analysis of human tumours illuminating.

Although an invaluable reference source with a useful glossary and a detailed appendix on numerical modelling, this text will be most valued by proponents of the art for pulling together a series of such wide-ranging and usefully detailed topics. Not all chapters will appeal, but most readers will consider their money well spent. After dipping into this text newcomers to the world of molecular biology could be forgiven for thinking there never was a time before microsatellites — how could biologists have got by without such phenomenally useful tools for so long?

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**Evolution of Biological Diversity.** Anne E. Magurran and Robert M. May (eds). Oxford University Press, Oxford, 1999. Pp. 329. Price £24.99, paperback. ISBN 0 19 850304 0.

There has been a great expansion of studies of biodiversity and speciation recently. By my reckoning, at least six single-themed international conferences and four multiauthored volumes addressing speciation have appeared since Otte & Endler's landmark volume *Speciation and its Consequences* (1989). The editors state that the aim of this latest volume is to explore the evolutionary origins of biological diversity in relation to population differentiation and population structure. This seems a narrower remit than it actually achieves because, in addition to population-level work, it includes chapters on the genetics of isolation and divergence and palaeontological perspectives on biodiversity.

Four chapters adopt a genetic approach to diversity and speciation. Coyne and Orr summarize knowledge of the genetics of pre and postmating reproductive isolation. Their table highlights the fact that few really informative studies are available, showing only 26 pairs or groups of organisms which they consider worth including. More could be added, but not many. Two chapters ask how genetic diversity within and between populations and species conform to theoretical expectations; not very well is the conclusion of both. Harwood

and Amos speculate about the role of selective sweeps and odd mutation processes (pointing out that it is far too convenient simply to infer that 'bottlenecks' are responsible for low heterozygosity). Tregenza and Butlin also show that heterozygosity conforms rather poorly to neutral predictions (taking account of apparent population size). A potentially important point they make is that the heritability of traits influencing alpha diversity, notably those involved in premating isolation, may have little relationship to heterozygosity inferred from neutral markers. Tautz and Schmid describe an ingenious method to detect quickly evolving genes — presumably those under selection and contributing most to divergence. This neatly reverses the usual orientation of work in evolutionary developmental genetics; the most interesting genes may be the least conserved.

Four chapters are directly concerned with population processes and speciation. Two document speciation in freshwater fish. Skúlason *et al.* argue that resource polymorphism and phenotypic plasticity may rapidly lead to sympatric speciation, illustrated by arctic charr (and elsewhere by sticklebacks and phytophagous insects). Turner documents the remarkable radiation of cichlids in African lakes (a striking calculation appears to show evolutionary rates of one new species per 10,000–100 000 years, compared with one per 2–4 million years in Hawaiian *Drosophila*, for example). Turner's favoured explanation is sexual selection, and the currently highly fashionable relationship between sexual selection and speciation is explored fully in another three chapters. Partridge and Parker, and Magurran, point out that strong sexual selection can in fact reduce speciation if strong intrasexual competition selects for males who circumvent female choice. The outcome of sexual conflict is therefore critical. A particularly thoughtful article by Price also challenges the simplistic view that high sexual dimorphism implies a direct role for sexual selection in speciation. He argues that rapid divergence of sexually selected traits in birds is unlikely to have a simple correlated response in sexual isolation, and that only later can sexual imprinting (or preference for traits diverging as a result of adaptive radiation) feed back to speciation. Clearly much more caution (and quantitative analyses) are required to assess the role of sexual selection in speciation.

Two chapters take a comparative approach. For me, Gaston and Chown's study of range sizes and speciation was too vague about the predicted and observed relationship between the variables for meaningful conclusions to be drawn. In contrast, Barraclough *et al.* show how clearly testable predictions allow inference of modes of speciation from phylogenies. Again, this is a study area which is in its infancy.

The remaining three chapters view the 'bigger' picture. It is sometimes argued (not only by Gould) that speciation biologists observe the world at too low a level to understand patterns of biodiversity. Gould's chapter encouraging a multilevel view of selection is both entertaining and thought provoking. Conway Morris and Sepkowski illustrate the historical patterns of biodiversity, showing how this is largely influenced by random factors such as mass extinctions and the

delay in rebounding from them. Also, major taxa vary quite dramatically in the rate of divergence and apparent speciation. As Sepkowski argues, much of the pattern of biodiversity reflects these characteristic (and 'heritable') rates of extinction and speciation, yet the reasons remain 'one of the great unsolved problems of macroevolution'.

The breadth of approach illustrated in this volume distinguishes it from similar recent publications. It is an excellent compilation of views of speciation and biodiversity (although the absence of any chapters on the plant or microbial kingdoms is remarkable). I would describe it as essential reading for anyone with an interest in speciation, were it not for the fact that more or less the same publications are also available in a volume of the Philosophical Transactions of the Royal Society (following a meeting in 1997). As I gaze at the pile of as yet unread, journals and books accumulating in a corner of my office, I am not very appreciative of any trend in publishing which artificially escalates this further. Either of these two publications is essential reading – to publish both independently seems unnecessary.

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**Basic Human Genetics (2nd edn).** Elaine J. Mange and Arthur P. Mange. Sinauer Associates, Inc., Sunderland, Massachusetts. 1999. Pp. 530. Price £27.95, paperback. ISBN 0 87893 497 9.

I found this book this book to be a pleasure to read: it was attractive, accessible and full of surprises. In chapter one I did not expect to start reading a detective story about phenylketonuria, but found myself enjoying this style of teaching. I can understand how the first edition of this book won its

awards from the American Medical Writers Association and others: the unpretentious style and accessibility of content will endear it to students of science as well as medicine, and this doctor found it refreshing to update myself in such an easy manner!

The book starts well with its contents pages: first an overview to find easily what the book covers, and then a more detailed guide to contents. A full, detailed index which works, is also worth mentioning. The 'boxes' are a useful addition to the main chapters, providing extra reading for those who wish it. The diagrams are on the whole a joy, especially those in three dimensions. The collection of key terms at the end of each chapter brought back memories of my own learning style as a student, which worked for me, and which I am sure today's students will find invaluable. The questions, with answers to check responses, will be an invaluable guide to most students, although I did find some answers to be rather dogmatic in their statements. There is room for more discussion in some of them.

Relevant social and ethical issues are raised in many of the chapters, firmly placing the science of this book in the context of those people with whom it concerns itself. It is not a concise book, and the conversational style this produces may not appeal to every scientist.

The book is honest when it admits it does not cover every aspect of the problems upon which it touches, but it does give a bibliography and comments upon further reading. Like many texts from the USA, I am sorry that it fails to mention major works by British authors in some instances, for example Peter Harper's book on Huntington Disease. The addition of a CD will appeal to students; I only hope they also take the time to read this enjoyable, informative book.

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## Books received

**Migration and Colonization in Human Microevolution.** Alan G. Fix. Cambridge University Press, Cambridge. 1999. Pp. 236. Price £40.00, hardback. ISBN 0 521 59206 2.

**Analysis of Human Genetic Linkage (3rd edn).** Jurg Ott. Johns Hopkins University Press, Baltimore. 1999. Pp. 382. Price £38.00, hardback. ISBN 0 8018 6140 3.

**The Genetics of Cattle.** R. Fries and A. Ruvinsky (eds). CAB International, Wallingford. 1999. Pp. 710. Price £99.50, hardback. ISBN 0 85199 258 7.

**Agricultural Value of Plant Genetic Resources.** R. E. Evenson, D. Gollin and V. Santaniello (eds). CAB International,

Wallingford. 1998. Pp. 285. Price £40.00, hardback. ISBN 0 85199 295 1.

**Transgenic Animals in Agriculture.** J. D. Murray, G. B. Anderson, A. M. Oberbauer and M. M. McGloghlin (eds). CAB International, Wallingford. 1999. Pp. 290. Price £55.00, hardback. ISBN 0 85199 293 5.

**In Situ Hybridization Protocols (2nd edn).** Ian A. Darby (ed.). Humana Press, Totowa, N.J. 2000. Pp. 343. Price \$79.50, hardback. ISBN 0 896 03686 3.