Book Reviews

Biodiversity Dynamics. Turnover of Populations, Taxa, and Communities. Edited by M. L. McKinney and J. A. Drake. 1998. Columbia University Press, New York. £48/$69 ISBN 0-231-10414-6.

Biodiversity is one of those wonderful words, so beloved of policy-makers, that is broad enough in its definition to allow everyone to subscribe to it. As the concept took hold in the wake of UNCED in 1992, taxonomists saw it as a chance to rebrand their discipline, while ecologists were encouraged to dust down diversity theories that had languished for twenty years. Conservationists, on the other hand, found a new name for doing what they had always done: conserving wildlife. As a result, when a new book appears with 'biodiversity' in the title (something that happens with remarkable regularity), the reader never quite knows what to expect. Some texts present one particular perspective, while others seek to integrate different disciplines, offering the possibility of synergistic gains in understanding. This book aims squarely at the latter, by presenting together 'data from population biology … with data from community ecology, comparative ecology and palaeontology'. In fact, this is really a book about evolutionary ecology.

This book contains eighteen chapters, which variously address different aspects of the origination and extinction of populations, taxa and communities through time. For example, there are individual chapters on the persistence of metapopulations through evolutionary time, the role of development in evolutionary radiations and a particularly useful chapter on diversification of mammalian body sizes. Several chapters deal with issues of scale, in relation to diversity patterns in both extant and fossil mammalian faunas. There is also the inevitable chapter on mass extinctions, with fluctuations in nutrient availability being invoked here as a primary cause.

Significantly, the book is dedicated to Michael Rosenzweig, and his view that species diversity displays equilibrial patterns underpins many of the chapters. For example, apart from a typically eloquent chapter by Rosenzweig himself, other authors address diversity equilibria in the context of North American mammals, and in relation to niche saturation and disturbance. Equilibrial theories have a long and august tradition in ecology, and at least in some situations, compelling evidence can be marshalled in their support. However, alternative theories exist. Non-equilibrium concepts get nothing more than a passing reference here (I had to look hard to find it), despite having generated some lively debate in recent years. The lack of such debate is a weakness of this book; a more critical approach to both the concepts and theories described would have been very welcome. I found it surprising that the most important book on ecology written in the last decade (Peters, 1991) did not merit a mention, despite (or because of?) the fact that it has some pithy things to say about theories of diversity equilibria, niche concepts and indeed the whole approach to the science.

What is there here for the geneticist? Remarkably little. The only chapter to specifically address molecular aspects of evolution is the excellent contribution by Gittleman *et al*., which analyses the relationship between ecological traits and molecular phylogenies in mammalian taxa. Some interesting features emerge from this analysis: for example whereas morphological and life history traits were significantly correlated with phylogeny, most of the behavioural and ecological traits were significantly correlated with phylogeny, most of the behavioural and ecological traits revealed little if any phylogenetic pattern. Elsewhere in the book, there is little reference to genetic aspects. In a book about biodiversity, which is generally considered to include diversity at the genetic level, this has to be considered as a serious omission. Recent progress in ecological genetics and molecular phylogeography is entirely ignored, despite its obvious importance for understanding the processes of speciation and extinction.

Overall, despite a high standard of presentation, I was disappointed by this book. The central tenet is a valid one: understanding evolutionary turnover is crucial to understanding current patterns of biodiversity. However, despite many worthy contributions and some novel ideas, the overall message has perhaps been lost in the rather copious detail. A summary or synthesis chapter at the end would have helped, and the book may have benefited from a more

international authorship (all contributions are from the USA). There is little evidence of the 'major theoretical and practical gains' which are promised at the outset, and the claim that this book contains 'practical information that can be of immediate use to management of biodiversity' is at the very least stretching a point. The application of equilibrial theories (notably Island Biogeography theory) to practical conservation has been a spectacular and controversial failure, as Peters (1991) points out, and it is worrying if this lesson has not yet been learned. Unlike some other books about biodiversity, it is unlikely that this will become a key text for those at the forefront of conservation action.

References

Peters, R. H. (1991). *A Critique for Ecology*. Cambridge University Press.

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Analysis of Triplet Repeat Disorders. Edited by D. C. RUBINSZTEIN and M. R. HAYDEN. Bios Scientific Publishers Ltd. 1998. 352 pages. ISBN 1 85996 266 1. Price £67.50.

Triplet repeat disorders arguably represent the most significant new body of understanding of human genetic disease mechanisms of the past decade. The discovery of the repeat expansions associated with Kennedy's disease and Fragile X mental retardation only occurred in 1991, with the myotonic dystrophy repeat hot on their heels in early 1992. This book provides a comprehensive coverage of the still expanding field of triplet repeat disorders, with a chapter dedicated to each disease associated with a triplet repeat. There are also informative general chapters covering mechanisms of triplet repeat instability and diagnostic and predictive testing. As one would expect of a multi-author volume like this, the style of each of the chapters differs markedly, with different amounts and types of information included in the individual chapters.

The Foreword by J. L. Mandel is an enthusiastic and concise overview of repeat instability as a disease mechanism. It raises the main questions and issues, many of which are left unanswered in this book. This is not surprising given that this area is still in its infancy and is rapidly evolving. An instance is the ethics of testing for repeat expansion alleles; this is still at the stage of research, treatments are not yet on offer, nor are there any immediate prospects of such treatments becoming available. However, the mechanistic questions set the reader up for what is to come. Jean-Louis also reminds us of how new all this really is in genetics, there being no other model systems in which triplet repeat expansions occur to serve as paradigms for human geneticists. This appears to be a disease mechanism as yet unique to humans.

The Introduction by D. C. Rubinzstein and M. R. Hayden (the editors) provides a general introduction to repetitive DNA and compares the characteristics of triplet repeats with these other sequences. However, it assumes a certain level of knowledge of the field of triplet repeats and therefore is confusing in parts. For example, the names of particular genes, their products and the associated diseases are not clearly defined, which is particularly important when discussing the different spinocerebellar ataxias. However, there is a very useful reference table summarising the disease associated with triplet repeats and characteristics of repeat instability. There is too much information on the intranuclear inclusions formed by mutant proteins with expanded polyglutamine repeat tracts. This would have been better in a general chapter on (GAG)n expansions and polyglutamine tracts (discussed below).

Each chapter has a useful introduction which summarises key issues and a summary/conclusion which puts the disease into context in the triplet repeat field. I comment on some specific individual chapters below but, in general, the chapters are clearly laid out, with well structured divisions within chapters and a smattering of useful diagrams and tables. This makes them easy to read and in particular, it is easy to find specific sections without having to read chunks of unnecessary text. Thus it is the sort of book that can be dipped into to read about a particular subject matter.

It would have been useful to have a chapter dedicated to (CAG)n expansions, polyglutamine tracts (although this is covered in chapter 11) and intranuclear inclusions, because these are common to a number of triplet repeat diseases. This could have served as an introduction to the (GAG)n repeat diseases, which are described in consecutive chapters. This may have circumvented what becomes a slightly repetitive description of polyglutamine tracts and intranuclear inclusions in a number of chapters. The logic behind the order of the chapters escapes me, perhaps some of the mechanistic chapters could have come before the individual diseases chapters. The diseases might have been logically grouped as nulls (FA and FRAXs), polyglutamine expansions, and finally DM.

Chapter 2 is a very comprehensive, readable review of fragile X although it is a little selective in its citation of references. The diagrams were a very helpful addition to the text. This chapter can be recommended to any level of worker as background on this disease. Very minor comments are that there is a mistake in

the title of the reference Rousseau *et al.* (1991*a*) at the end of the chapter and the references do not appear as up to date as other chapters.

Chapter 3 is a generally informative and brief review of FRAXE and FRAXF. It is confusing in parts, especially in section 2, which discusses the FRAXE trinucleotide repeats, repeat distribution and ancestral alleles.

In general, chapter 4 is well written and covers the extensive and often conflicting literature on myotonic dystrophy in a style that is both informative and easy to understand. As well as describing in detail all the necessary background information, the chapter discusses current views on 3 models of disease mechanisms in DM, as a result of the (CTG)n repeat expansion: (1) nuclear retention of mutant *DMPK* transcripts which could lead to decreased levels of DMPK protein, (2) novel function/interaction for expanded CTG/CUG repeats, (3) field effect on neighbouring genes. The chapter has a bias towards the authors' research and ideas, which is to be expected. However, it therefore contains interesting unpublished data. There are some mistakes and inconsistencies in nomenclature and in the legend to figure 2, it incorrectly says that the *DMPK* gene is on chromosome 13, rather than chromosome 19! *DMAHP*, the gene downstream of *DMPK*, and the focus of much of the most recent DM papers, is discussed, but rather superficially.

Chapter 11 on Huntington's disease is very long and written with a clinical bias. There is a paucity of tables and diagrams and no summary at the end of the chapter. The molecular biology is not explained very clearly and the nomenclature is not defined. For example, the *HD* gene, IT15, HD mutation and huntingtin are all discussed but without being defined.

Chapter 16 is a reasonably well written account of diagnostic testing for trinucleotide repeat diseases although there are a few apparent omissions. For example, page 276, para. 2, line 6 "PCR techniques are routinely performed in a small proportion of cases" is not a comment true of fragile X screening in the majority of UK diagnostic laboratories. This inconsistency may have arisen because the two authors are American. Diagnostic policy and referrals can differ markedly between the US, Europe and the UK and is not referred to anywhere in the text. The table on page 292 might have been better placed at the beginning of the chapter. A similarly laid out table summarising the diagnostic procedures for each of the disorders would have been helpful to unite the different sections and to cross-reference with the other book chapters.

Chapter 17 is titled "Predictive testing for trinucleotide repeat disorders" but it is not entirely obvious why this chapter is devoted almost exclusively to HD, and discusses in detail many of the ethical considerations involved in predictive testing of any disorder, without a great deal of information on testing specifically for triplet repeat diseases. An amalgamation of chapters 16 and 17 may have been a more informative approach.

Overall it is not clear who this book is aimed at, as some of the individual chapters are written with an in-depth knowledge of their subject and in places not enough background information has been included to make this approachable by the general reader. In this context, some general editing to clarify and unify names of diseases, genes and proteins would have been helpful. Much of the subject matter is covered in more depth in other publications, such as *Genetic Instabilities and Hereditary Neurological Diseases*, edited by R. D. Wells and S. T. Warren, Academic Press, which also appeared in 1998. However, the volume of text in this book make this a manageable reference book for those wishing to have a reasonable overview of the subject matter, and as such it represents a valuable addition to the reference material available to both clinical and academic readers wishing to rapidly summarise this rapidly moving and expanding research field.

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