

Book reviews

Biological Evolution. Peter W. Price. Saunders College Publishing (Harcourt Brace College Publishers), Orlando. 1996. Pp. 429. Price £19.95, hardback. ISBN 0 03 096843 7.

Choosing textbooks for undergraduate courses in evolution is a daunting prospect. To date, textbook options have generally fallen into two categories: (i) traditional books in which students are given the facts in a straightforward manner, but the excitement of the field is often lost amongst the excess 'baggage' of information accumulated over the years, and (ii), narrative books in which facts are woven together in a story-like fashion in order to give students information in a more 'palatable' form, but at the same time lead to much confusion. Price has adopted a new approach in his book that is extraordinarily refreshing and will be particularly valuable to undergraduates that are not yet fully convinced as to the attraction of evolutionary biology. There are two attributes that stand out as being immensely important for introducing students to ideas of evolution: (i) the deeply historical perspective, and (ii), the activity of the field, and the excitement of ongoing research and debate. In addition, the solid factual presentation, copiously and carefully illustrated, makes it very easy to follow.

Price explains that this text is organized in a framework that is more historical than biological; 'big picture' concepts in macroevolution are treated before microevolutionary processes. This approach is sound, particularly in a course designed for undergraduates who are unlikely to be turned on by the more abstract concepts of microevolution. The introduction to the book is an undisguised history lesson that is guaranteed to captivate even the most hesitant of students. Price meticulously 'sets the stage' for the development of evolutionary thought during the time of Darwin. The reader is transported into Darwin's life and given the spectrum of thoughts and emotions that he would have experienced, as well as the extent and limits of knowledge at the time.

The book has its faults, and in particular some important topics appear to have been overlooked: there is virtually no mention of effective population size, Fisher's fundamental theorem, frequency dependent (apostatic) selection, or kin selection. The detailed treatment of some other topics (for example the Raup, Schopf and Simberloff model of extinction and the gene-for-gene hypothesis of coevolution) may seem excessive. In addition, the common thread that holds together much of the book is the need for phylogenetic understanding. However, phylogeny is not defined until p.277, and is not in the glossary. In terms of 'jargon', Price justifies his introduction of important biological terms; however, a number are not defined (stenophagy, dosage effects, homoplasy, mygala-

morph, panmixia). How DNA sequences can be used for examining phylogenetic relationships is also mentioned but not explained. Finally, some minor points. Examples are given for phenomena without any explanation (skyrockets are an example of semispecies — but we are not told what skyrockets are, where they occur, or why they are a good example of semispecies), and the choice of placement of figures sometimes is odd (for example, to compare a zebra and a gerenuk, the reader must turn a page).

However, these shortcomings are trivial in consideration of what Price has achieved in his book, and could easily be rectified in future editions. Price has made a product that exudes energy and inspires inquisition. It is factual and straightforward, yet at the same time immensely easy to read, exciting and absolutely current. The true test of the book will be the upcoming semester when I will use it in my class. Never before have I approached the use of a book with such confidence as to its appeal.

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Evolution — The Four Billion Year War. Michael Majerus, William Amos and Gregory Hurst. Longman Group Limited, Harlow. 1996. Pp. 340. Price £19.99, paperback. ISBN 0 582 21569 2.

Ever since Darwin, the British have been fascinated by evolution. *Via* Bateson, Haldane, Fisher and Ford to Maynard Smith, Hamilton and the current generation, British scientists have contributed a distinctive flavour to evolutionary theory and the data that inform it. This book is, though the authors do not say so, a celebration and an updating of that tradition. It is written in an informal, unpolished style that readers may find endearing or enraging. We are at once on first name terms with all the authors' friends, with Bill and John, Sir Cyril and Sir Alec. This emphasis on personalities runs deep: there are more people listed in the index than there are organisms, and more than a third of the people are British. The authors are not afraid to bring forward examples from their own work, but they have wide-ranging interests and the result

is a surprisingly comprehensive and fascinating mix ranging from behavioural ecology to the evolution of satellite DNA. There is nothing wrong with a book that takes this personal line: the result is warm and wet, idiosyncratic and opinionated but definitely alive. It would never do as a course text for a class of dull undergraduates — they might believe every word of it — but should sharpen the curiosity and the critical faculties of a would-be researcher.

This is no dusty history of distant battles, but a bundle of dispatches from the front. The first 3990 million years of the war are dismissed in a couple of paragraphs, so we are immediately confronted with the big questions: 'Why do tiger-moths click?' and 'How did the peacock get his tail?'. Before reaching the front we are invited to wade through a rather boggy chapter on mutation. This is a poorly signposted minefield littered with unstable devices like isochores and molecular drive; a fascinating area but best avoided unless you bring your own map. There follows a dutiful canter across the arid plain of formal population genetics, enlivened by the occasional outburst of rebellious facetiousness. 'Consider a fictitious species with a generation length of two years. Two centuries ago this unfortunate beast met with disaster. Oriental gurus suddenly realised that the only sure way to cure a sprained ankle was to apply a poultice containing extract of its left tear duct. Consequently, the species was hunted down to an effective population size of 1000, from which it never recovered.' Endearing or enraging?

Eventually we come face to face with the politics of war: selectionism, mutationism and neutralism. At first, life is a picnic with classic English cuisine. We are served lavish portions of swallowtail, scarlet tiger, meadow brown and banded snails. As our boys tuck into yet another helping of peppered moth, their healthy outdoor life is disturbed by the distant thunder of enzyme electrophoresis. However, this chemical trickery was largely perpetrated by foreigners and, like the Japanese deployment of the sinister but odourless neutral theory, merits no more than a sideways glance. Then it is back to the noble all-British virtues of altruism and co-operation, and the equally British, if less noble, obsession with sexual selection. After wide-ranging and informative forays into interspecific interactions and intragenomic conflict, the authors finally come clean about the dark secret we have suspected all along: they have been practising Molecular Methods. In a revealing account that pulls no punches, we are shown that such methods are nothing to be ashamed of and can, if properly used, enhance one's performance. The dangers, too, are laid bare: 'Any scientist who understands the basis of RAPDs, and so potentially could use them in an informative way, would almost certainly know enough to avoid them like the plague!'. It needed saying.

Our heroes then gallop across the fields of speciation, phylogeny and the evolution of sex, lashing out boldly and leaving their victims to lick their lacerations. Finally, they arrive at their destination and hitch their horses to the wagon of the future, gaily painted with the letters 'DNA'. For all its quirkiness, this book is flavoured with a vital

ingredient: the enthusiastic expertise of authors who have eclectic interests and first-hand experience of the subject. It is definitely a good read.

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Plant Gene Isolation — Principles and Practice. Gary D. Foster and David Twell (eds). John Wiley and Sons, Chichester. 1996. Pp. 426. Price £35.00, paperback. ISBN 0 471 95539 6.

This book is an edited collection of articles describing the different experimental approaches that can be employed to isolate plant genes, ranging from the long-established cloning and screening techniques to the newer genetic strategies. In my view, it is one of the most useful methodological texts I have seen in recent years. A valuable feature is that virtually every approach that one may wish to employ in plant gene isolation is included in this one volume. The only method that I wanted to see given fuller coverage is the yeast two hybrid system. A second successful feature of the book is that each chapter manages to provide a detailed, readable account of the development and principles of the techniques described, as well as to give practical guidance and, in some cases, protocols. Integrating both aspects is not easy to achieve and the editors and authors deserve credit for striking the right balance.

The book starts with a review of the structure and organization of plant genomes which highlights recent progress in comparative genome analysis and provides a good background for some of the later chapters. There follow chapters on making cDNA and genomic libraries and an account of YAC, BAC and cosmid library construction. I found the latter article particularly useful and timely because of the key importance of these technologies in map-based cloning strategies. Subsequent contributions describe the various methods of screening libraries, including the use of heterologous and homologous probes, differential screening, and screening expression libraries with antibodies and oligonucleotide probes. A chapter is included on the application of functional complementation in yeast and *E. coli* to clone plant genes, an important and increasingly used technology. The next part of the book focuses on genetic approaches. There is a good account of mutagenesis and genetic analysis followed by a well-written exposition of chromosome walking and map-based cloning, not the easiest of topics to explain well. Further chapters describe insertional mutagenesis using T-DNA and transposons. At this point the book returns to non-genetic approaches with an informative chapter devoted to PCR techniques. There follows a review of subtractive methods and a final chapter on sequencing projects. In general I found the articles authoritative, accessible, informative, appro-