

## Book reviews

**Evolution (2nd edn).** Mark Ridley. Blackwell Science, Oxford. 1996. Pp.719. Price £22.50, paperback. ISBN 0 86542 495 0.

The first edition of *Evolution* was a landmark undergraduate textbook. Here was a book which covered the whole of evolution and which gave complete and thorough explanations. What of the second edition? Broadly it covers the same material, ranging from absolute geological time to zygotic isolating mechanisms, via beak size, cladism, the handicap theory, the iridium anomaly, outgroups, parsimony, retroelements, titanotheres and unrooted trees. There are 23 chapters in the same five sections: Introduction, Evolutionary Genetics, Adaptation and Natural Selection, Evolution and Diversity, Palaeobiology and Macroevolution, but there are changes at all levels. Coevolution gets a chapter of its own as does the fossil record which is promoted from an appendix. Individual chapters have changed too: for example, Mukai's work on the rate of deleterious mutations is added, in some detail, to the chapter on quantitative genetics and there are new sections on the origin of scattered repeats and the possible benefits of sex in reducing numbers of deleterious mutations. In Chapter 16 asymmetric speciation is out and in comes a welcome section on speciation by polyploidy in plants. Some examples too have been improved. Out go *Panaxia*, *Larus* and the Turkana snails as examples (respectively) of selection in action, ring species and punctuated equilibria to be replaced by *Passer domesticus* in America, an updated account of *Ensatina* and Caribbean bryozoans. Although there are many such changes, they have little effect on the coverage of the subject which is still balanced and thorough. They represent an updating as reflected in the extensive list of 800 references of which around 100 are post 1993 (the date of the first edition). As in the first edition the care taken to explain ideas, theories and data is exceptional; Ridley takes the reader by the hand and patiently guides them through what is often complex material. These explanations are greatly assisted by the large number of diagrams, drawings, graphs and tables, now in two colours with two percentage tints in a tasteful shade of blue.

The net effect of these changes, I estimate, should not have led to an increase in the size of the book, but with 719 pages and weighing in at 1.8 kg, it is bigger and heavier than its 670 page predecessor. This is partly to do with layout; the section headings have moved from the left margin to the start of each section which, together with the blue line between sections, makes the appearance of the page more attractive. Also the list of contents and the index are expanded and thus much improved. In the first edition each chapter ended with a summary but now

each also has an Introduction. While this obeys the old dictum, 'say what you are going to say, say it, say what you've said', which is pedagogically sound, it is perhaps overkill. There are also four pages of colour plates. These enhance the readers' knowledge of mimicry in *Papilio memnon* and hybrid species in *Iris hexagona* but I'm not convinced the same is true for other subjects such as *Ensatina* and Darwin's finches.

Some of the extra pages can be accounted for by the addition of study and review questions at the end of each chapter (with answers). I suppose this is aimed at the US market, but do we need them? A book like this which covers so much and sets things out so clearly could threaten extinction for lecturers who teach evolution to undergraduates. Ridley might at least have left us to dream up the questions! There are some mistakes. Some are small irritants such as the  $q^3$  on p. 101 and the Å on p. 163. However, others, for example the use of numbers for the various stages in Fig 13.3 when the legend and text use letters should have been picked up as should the disaster with the formulae on p. 158.

All in all this is an excellent book. Undergraduate teachers should have a copy; it is full of up-to-date material, nice examples and explanations of difficult topics. I doubt that many students will be persuaded to buy it, partly because of the cost and partly because of its scope. It covers too much and my guess is that in these days of modules, few students study evolution in its entirety and this deeply. It should nevertheless feature prominently on reading lists for courses in evolution at all levels and students should be referred to it constantly.

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**Evolution CD-ROM.** Mark Ridley. Blackwell Science, Oxford. 1996. Price £29.50 (in UK with VAT, £34.66). ISBN 0 86542 757 7

I installed this with no problems and it ran quickly and efficiently on a Pentium 75, with 8 Mb of RAM, a 1 Gb hard drive and a super VGA monitor. On my 15" screen the display occupied a rectangular panel of about 26cm by 13cm, usually subdivided into two squares. One contained text and, where appropriate, the other contained a picture, diagram or a simulation. There are 7 parts: Timeline, Classic texts, Experiments, Image gallery, Video gallery, A–Z browser and Tutorial, and they were all easy to access and use.

The best part comprises the five tutorials and this is a convenient place to start because it interacts with several of the other parts. 'Foundations of Evolution' deals with molecular and Mendelian genetics in three sections (building blocks of life, essentials of genetics, laws of heredity) each comprising several screens of text, pictures and diagrams. 'Evolutionary Genetics' has seven sections including one on random events which I worked through. It is divided into 5 sections with about 20 screens of information which includes an animation of the founder effect. This has rare red and common yellow dots (= butterflies) on a green island on which a storm is going to (non-selectively) destroy most of the insects, and lead to an increase in frequency of red butterflies. In due course the sea darkens (the storm?) but what happens is that a small number of dots migrate across the seas to some adjacent land. The original population becomes all yellow, while the migrant population ends up with equal proportions of the two types! You can also run an experiment to examine the effect of drift in populations ranging in size from 10 to 99. The tutorial finishes with a summary and 5 questions. There are other good tutorials on 'Adaptation & Selection', 'Evolution & Diversity' and 'Palaeobiology', although in the latter the section on rates of evolution has the wrong summary. All the tutorials include pictures from the image gallery and material from the video gallery.

The A-Z browser is good too, and allowed me to explore the meaning of over 200 terms, via words, and sometimes pictures/diagrams or animations. These range from adaptation, through Cope's rule and pleiotropy to variance and Zahavi's handicap. For 'adaptation' there is a picture of *Geospiza* some 150 words of explanation and links in the text to other terms such as natural selection, constraints, drift and evolution of the eye, which in turn has an animation describing the results of Nilsson and Pelger's computer model on this subject. There is a link to the video gallery with Maynard Smith on 'What is an adaptation?' and at the end there are further links to 'Recognising adaptation' and 'How we find out if selection is at work'. Other entries were much shorter and less complex, 'locus' had 30 words and 'mitosis' 55, while some entries have no pictures.

Video gallery features brief explanations or comments on topical points by twelve leading evolutionary biologists such as Maynard Smith, Dawkins, and Hamilton. For each of them there is a choice of between 2 and 7 topics and, once chosen, we hear and see them deliver the information which is also displayed as text. So, for example, you can have around 70 words by Simon Conway Morris on why stasis occurs or Linda Partridge on what is non-coding DNA. The image gallery is a collection of around 120 still photographs ranging from *Agrostis tenuis* to zebras, each accompanied by up to 50 words of text but I found many of these disappointing. Sometimes the quality of the picture is poor; for example, it is impossible to make out the grey squirrel or see what is going on with the '*Formica* ant defending'. *Escherichia coli* is a mass of blue specks

which could be anything and the frontal view of a manatee is not informative. Marine iguanas appear not to exist. Often the text is not that informative either; the damselfly and damselflies mating have the same text, while all we learn about the pigeon is that it is a cosmopolitan species. The comment that 'reptiles such as this (my emphasis) dominated land during the Permian' which accompanies the short-horned lizard is misleading.

Timeline takes one through the history of life on Earth in pictures and words in a series of about 40 stages. At the bottom the four eras are displayed and, on choosing one, the relevant subset of geological periods appears on the left. In the centre there is a relevant picture and on the right a commentary in text that can be scrolled through. Classic texts contains 20 classic papers including the 'Spandrels of San Marco' and 2 chapters from each of the *Origin of Species* and the *Genetical Theory of Natural Selection*; compared to the rest of the material I thought that these were very advanced. There are 6 virtual experiments, i.e. computer simulations of evolutionary phenomena. You can, for example, observe the effect of selection for oil content in maize, and simulate selection against a recessive. Although easy to use I found these rather elementary compared to other simulation packages available. The range of input values is limited, the graphical displays are rather small and the results of one simulation cannot be retained or printed for comparison with others.

In conclusion some of this CD is very good and it could be used to support courses at a first or second year undergraduate level although it is expensive and, unlike the book, there is not much to engage or challenge a third year student. Other parts do not really earn their keep and my sample of the material revealed quite a few errors and problems which need to be ironed out.

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**Antibody Engineering — A Practical Approach.** John McCafferty, Hennie Hoogenboom and Dave Chiswell (eds). IRL Press (Oxford University Press), Oxford. 1996. Pp. 325. Price £27.50, paperback. ISBN 0 19 963592 7.

'Everything you wanted to know about antibody engineering but were too afraid to ask'. This aptly describes a comprehensive book which has assembled in one volume the protocols required by the researcher to generate and engineer novel antibodies or fragments. The text contains an extensive number of tried and tested protocols by leaders in the field, covering all aspects of antibody engineering; including construction/manipulation of antibody gene repertoires in bacteriophage and in transgenic mice, measurement of antibody affinity, analysis of antibody sequences, 'humanising' antibodies by CDR grafting,