

tive readers may be warned that they will find much of it to be somewhat indigestible. The very scale of the feast is itself daunting as course follows course, and long sections — especially in Part 3 which analyses the forces responsible for shaping our natural knowledge — make very considerable demands upon the reader's powers of concentration. Only an insomniac is likely to select the tome as bedtime reading. Rudwick explains that he had three classes of reader in mind: sociologists and philosophers of science; historians of science; and practising geologists. The first two of these will neglect the book at their peril; Rudwick adduces from his study many lessons which have wide applications in areas of science far removed from those here discussed.

Whether he will be able to win and hold his third class of reader — the geologist — is less certain. He hopes that his book will encourage geologists to reflect upon the nature of their own research activity and he certainly invites them to contemplate some fascinating matters. Not the least of these is the question of the relationship between the human construct of a Devonian System and the actual character of events as they occurred upon the surface of the Earth hundreds of millions of years before the appearance of *Homo sapiens*. In short, in Rudwick's own words, what is the reliability of the Devonian System "as a representation of a portion of a real past history of the earth"? Few geologists will ever have been confronted by so startling and disconcerting a question but surely a work built upon a rather less grandiose scale than this one would have offered far more hope of capturing the attention of practising earth scientists and of turning them momentarily aside from their electron microprobes and X-ray diffractometers.

Rudwick concludes his story at the somewhat unsuccessful Cork meeting of the British Association held in August 1843, but an Irish geologist must observe that had Rudwick chosen to linger awhile amidst the rocks of southern Ireland he might have added one final twist to his tale. In the 1860s Professor J. B. Jukes, the Director of the Geological Survey of Ireland, became convinced that in southern Ireland he had discovered a unique key to the rocks of Devon and he sought to have re-opened the entire Devonian issue. Jukes was one of the finest field geologists of his generation but his one-man campaign had achieved little by the dawn of the day in early May 1869 when he found himself committed to a Dublin lunatic asylum. There Jukes died two months later. That bizarre little episode now awaits the attention of some scholar eager to erect an outhouse to the rear of Rudwick's splendid Gothic edifice. □

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The trouble with book making

Colin Patterson

Oxford Surveys in Evolutionary Biology. Volume 1: 1984. Edited by R. Dawkins and M. Ridley. *Oxford University Press: 1984 (1985).* Pp. 227. £25.

THIS is an enigmatic publication. Though it looks like a book, with hard cover and dust jacket, it is the first issue of a new serial. Though new, the only introductory or explanatory matter lists a 15-strong editorial board which does not include one of the two editors. Though edited and published in Oxford, UK, all 11 contributors are American.

Given no introduction or policy statement, the reader must reconstruct the aims and scope of the *Surveys* from the contents, seven papers and a book review supplement. The papers are: J. T. Bonner on chemical signal-receptor systems; Lynn Margulis and Dorion Sagan on the origins of sex and its maintenance not as adaptation but as "imperative relic"; J. E. Lloyd on deception in nature, particularly in firefly flashing; D. H. Janzen on sphingids and saturniids as alternative ways of being a big moth; O. T. and D. J. Solbrig on plant growth hierarchies and fitness; M. T. Clegg on multilocus population genetic theory and practice; and Niles Eldredge and S. N. Salthe on hierarchy and evolution, a shot at outlining a theory more complete than neo-Darwinism. Finally, M. T. Ghiselin reviews "nine books of cladism" — "on" is intended here, and the books reach back to the 1970s, though one might miss the fact since the publication date of the oldest is omitted.

Of course, that last comment is carping over trivia, but misprint, anachronism and omission are unfortunately typical of the slapdash production of this book. For example, mismatches between text citations and bibliographies are rife — in one paper 26 per cent of the references mentioned in the text are inconsistent with the bibliography. The same bibliography contains 1985 publications along with 1983 papers cited only as "in press", without title or journal. And Daniel Janzen's fascinating essay is marred by execrable printing of the four colour plates.

At 55 pages Janzen's paper is the longest and has the strongest empirical content of any in the book, but that content is not to be retrieved from the index, which is formed on some idiosyncratic principle by which certain papers are indexed in excruciating detail, but Janzen's is found under only three headings (the name of the Costa Rican park where the work was done and the names of the two moth families, one of which is misspelled). While the general tone of most of

the papers is panselctionist, or organismic rather than molecular, the index gives precisely equal space to genetic drift and natural selection, one page reference each. In short, the index is untrustworthy and so useless.

But what about the papers? Well, they vary greatly in what they demand of the reader; some are original; most are conspicuously well written. I hope that others may appreciate their quality without the mounting irritation over production faults that spoiled my reading. If this new serial is to make itself a niche among the journals and the various *Annual Reviews* that cover the burgeoning field of evolutionary biology, someone will have to take a lot more trouble over it. □

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On scale

E. J. Aiton

Measuring the Universe: Cosmic Dimensions from Aristarchus to Halley. By Albert Van Helden. *University of Chicago Press: 1985.* Pp.203. \$30, £27.50.

ALTHOUGH the generally accepted scheme of planetary distances remained virtually unchanged throughout the Middle Ages and up to the time of Copernicus, it is only within the past 20 years that Ptolemy has been shown to have been its author. Following a surmise of Willy Hartner that the planetary distances were contained in a missing part of Book II of Ptolemy's *Planetary Hypotheses*, Bernard Goldstein located the scheme in a section of an Arabic version of Book I which has not survived in Greek.

The story of man's endeavours to assess the scale of the Universe goes back to the third century BC and the attempts of Aristarchus to measure the sizes and distances of the Sun and the Moon. His methods of lunar dichotomy and eclipse observations, though mathematically sound, depended on an accuracy of measurement which is impossible to achieve even today. As for the distances of the planets and stars, Ptolemy, writing in the second century AD, could only appeal to a system of space-filling spheres that could accommodate his eccentrics and epicycles.

In his study of the evolution of thought on cosmic dimensions, Albert Van Helden offers a clear and informative analysis of the sources and also the findings of modern scholarship relating to an important aspect of astronomy which has not hitherto been the subject of a separate monograph. He sees the invention of the telescope as a turning point in the path leading from the philosophically based scheme of Ptolemy to the determination