

as the earlier *Cambridge Encyclopedia of Archaeology*, or it may be that the name was chosen with the intention of competing with the *Encyclopedia of Human Evolution and Prehistory* edited by Tattersall and others and published by Garland in 1988. The latter is alphabetically organized, but in truth there is little practical difference when it comes to looking up something. The Cambridge book has what seems to be a comprehensive index, and boxed notes at the end of each chapter give cross references to other relevant items in the text. In many ways the two books are complementary, since the Cambridge volume tends to place more emphasis on genetics and primate behaviour and less on the hominid fossils that form the substance of much of its 'rival' and indeed of most treatments of the subject. However, for my taste the Cambridge format results in an overemphasis on primate behaviour, the outcome, I imagine, of asking for small chapters rather than an alphabetical entry. While no doubt a worthwhile subject in its own right, I find it difficult to believe that much of the primatological details given here tells us very much about the specifics of human evolution.

So how successful is the whole thing? The book certainly provides a vast array of information, much of it, as Richard Dawkins stresses in an enthusiastic foreword, "right up to date". I would be less happy than he appears to be about being consigned to a desert island with only this, the Bible and Shakespeare for company, although I suppose that each does have a lot of useful pages. But it is reasonable to ask where it is aimed. The level and quantity of information generally imply at least an undergraduate audience: the interested lay person would have to be pretty interested to cope with it all, and although the price is not excessive by textbook standards, it is still not cheap. The book gives no clue to its intended audience, since neither the general introduction by Pilbeam, nor the brief outlines of contents that preface each section, offer much in the way of overviews. That, I suppose, is in keeping with the concept of an encyclopaedia, where one chooses what one wants to know about and looks it up. Perhaps the nearest thing to a statement of intent may be found in the boxed section on page 15, where Jones has a good and entirely appropriate go at the blinkered nature of creationism and its denial of evolution, ending with the hope that the encyclopedia will help put an end to such nonsense.

So far as content is concerned, the accuracy of the text appears to be reasonably high. But then it should be, given that the contributors are experts (although only Dawkins tells us that, and then in passing). Specialist readers, I am sure, will therefore find it a profitable source of information with summarized treatments on topics outside their immediate area of expertise: I felt that, for once, I actually understood the method of dating by electron spin resonance as described by Brown on page 185. However, given the level of audience likely to consult the volume and the need for balance, there are drawbacks to letting authors loose in this format. The absence of text references is not really overcome by a list of further reading at the end when it comes to dealing with contentious issues, and the brief section overviews are inadequate as more than a slightly annotated listing of the chapters to appear in the following few pages. Given Dawkins' remarks about being "right up to date" I was, for exam-

ple, surprised to see little or no attention given to disputes over the question of DNA hybridization results for separating humans and great apes. The chapter on the topic by Sibley simply repeated the now questioned conclusion that humans and chimps are more closely related to each other than either is to the gorilla. I was less surprised (but still disappointed) to see that the 'isolation' concept of species advocated by Mayr and others was accepted without discussion of alternative points of view that have appeared in some number in recent years. In addition, I was extremely surprised to read in the discussion of fossils as dating indicators (page 184) that giraffes (family Giraffidae) as well as pigs (family Suidae) are included in the family Bovidae (antelopes). This section does also let the side down a little in terms of being up-to-date, since what is described as an important dating indicator, the pig genus *Mesochœrus*, has long been considered a junior synonym of *Kolpochoerus*. All of this serves to underline what we all know; that unreferenced texts are best read by someone familiar with the subject in the first place, and should be employed carefully as a useful source of summarized information. Seen in this light, this is a book well-worth having.

ALAN TURNER

Department of Human Anatomy and Cell Biology
Liverpool University
Liverpool
U.K.

Monitoring Genetically Manipulated Microorganisms in the Environment. (Wiley Biotechnology Series). Clive Edwards (Ed.). John Wiley and Sons, Chichester. 1993. Pp. 198, hardback. Price £29.95. ISBN 0 471 93795 9.

With an increasing number of releases of genetically engineered microorganisms (GEMs) being planned and executed, this is a highly topical book. It is concerned with the extraction and monitoring of GEMs in the environment. The initial design of the GEM is considered only with regard to the incorporation of reporter genes, and minimal attention is given to reasons for releasing GEMs into the environment. Presumably these aspects are covered by other volumes in the series. Extraction and identification difficulties for GEMs in various environments are considered, and detailed descriptions of methodology are given, enabling the reader to consider their application to his own situation. Without exception, all chapters are extremely well explained, accessible to the novice, of interest to the practising scientist and accompanied and clarified by simple diagrams and informative tables. Points are well referenced for those who want to explore them further.

The book starts with a good introduction to bacteriology for the uninitiated. Indeed, having read this book, the uninitiated may be forgiven for assuming that bacteria are the only form of microorganism. With the few exceptions of mentioning viruses as GEMs three times, discussing bacteriophage-mediated transduction of genetic material between bacteria, and some consideration of fungi, the book is devoted to

bacterial GEMs. However, as stated by Saunders and Saunders in their chapter, the first UK field release of a GEM was that of a genetically marked insect virus, *Autographa californica* multiple nuclear polyhedrosis virus. In the light of this information, it seems to me a large omission that the subject of genetically engineered viruses is not given more attention.

Various release environments are considered, and the authors of some chapters are given the unenviable task of arousing the reader's interest in such subjects as compost and the ins and outs of soil structure. I must say, they rise to the challenge admirably. Amner, Edwards and McCarthy reveal the psychedelic nature of release studies of vivid purple and green strains of *Saccharomonospora viridis* in compost, and present the surprising observation that spontaneous heat generation in compost composed of straw and manure can reach temperatures of 70°C. Similarly, one might expect a treatise on the microscopic complexity of soil to be dry and lifeless. Conversely, O'Donnell and Hopkins present a fascinating account of soil structure, which is necessary to appreciate the problems of extraction of microorganisms from soil.

The book is rounded off with a chapter on mathematical modelling of the release of GEMs in the environment. If, as I did, you consider that this has been situated at the end of the book as a cure for insomnia caused by the worries of how you're going to safely monitor your genetically engineered pet, then think again! J. I. Prosser begins with a clear and concise exposition on the what, why, and how of mathematical modelling. He doesn't attempt to bog one down with equations of complex models, but presents instead the equations of simple ones in order to whet the appetite for more.

All in all, this is a book in which diverse disciplines are merged to give a broad and painless introduction into a controversial and essential topic. I would recommend it to anyone interested in genetic manipulations.

ALISON MERRYWEATHER-CLARKE
Institute of Virology and Environmental Microbiology
Natural Environment Research Council
Marsfield Road
Oxford OX1 3SR
U.K.