Chapter 12. There are over 90 pages of references, running up to 1983 which is about the norm given the production schedule for a book of this sort.

The claim to comprehensiveness, expessed in the subtitle of the series, seems to be justified as far as the chosen topics are concerned, but the editor Dr Leon Browder admits that some areas have had to be left out because of the "open-ended nature of the topics". Thus while there is a rather heavy emphasis on yolk and shell — interesting stuff, as it turns out, with an especially good chapter by R. Wallace — there is nothing on egg polarity, on embryonic determinants (except insofar as the last chapter, "Genetics", touches on this issue) or on meiosis, kinetochores or the synaptonemal complex. Given these omissions, it is odd to find a whole chapter devoted to annulate lamellae, one of the last cytoplasmic organelles whose role is still uncertain.

The chapters on the control of gene activity are pretty dry reading, with the stress more on the "comprehensive" in the series title than the "synthesis". The RNA found in oocytes still seems to be poorly understood despite much detailed study; and lampbrush chromosomes are apparently as mysterious as ever. A chapter devoted to ribosomes would have been at least as appropriate as the one on annulate lamellae. There is, however, a very clear account of 5S RNA synthesis in frog oocytes by A. Kramer (though it does seem odd that it wasn't written by D. Brown or Kramer's ex-colleague, R. Roeder). And while J.B. Gordon doesn't actually work on oogenesis as such, he and his colleagues' work on the stage 6 *Xenopus* oocyte has been so copious and influential that the absence of a contribution from him or any of his associates struck me as slightly strange. It is also a pity that several other well-known authorities in the field had already contributed to Vol. 1 of the new edition of Metz and Monroy's *Biology of Fertilization* (Academic Press, 1985).

This collection is more coherent than many other examples of the multi-author genre of book (eggs is eggs, after all), but an introductory overview would have been helpful. The nearest thing is A.W. Schuetz's long opening chapter entitled "Control Mechanisms of Oogenesis and Folliculogenesis" which has some good things in it especially towards the end. But I was lost all too often in this essay, as starfish, mice, pigs, frogs and fish flashed briefly by. Schuetz's opening sentence, which begins the book, is also faintly worrying: "In most animal species a single cell, the female gamete, is the primary or only cellular link between the present and successive generations". Are there really animals that *don't* have eggs? □

Tim Hunt is a Lecturer in the Department of Biochemistry, University of Cambridge, Tennis Court Road, Cambridge CB2 1QW, UK.

In the past climate

John Birks

Quaternary Paleoclimatology: Methods of Paleoclimatic Reconstruction. By R. S. Bradley. *George Allen & Unwin:1985. Pp.472. Hbk £30, $50; pbk £13.95, $24.95.*
Paleoclimate Analysis and Modeling. Edited by Alan D. Hecht. *Wiley:1985. Pp.445. £63.25, $66.45.*

Ian Ball (*Systematic Zoology* **24**, 407; 1975) has suggested that many sciences develop in three stages: from (i) a descriptive phase when patterns are detected and described, through (ii) a narrative phase when inductively based explanations are proposed for the observed patterns, to (iii) an analytical phase, with a hypothetico-deductive basis, in which competing hypotheses about underlying processes are tested. Quaternary palaeoclimatology is in transition from a narrative to an analytical phase, and is thus acquiring what Popper terms "scientific maturity".

In the past 20 years, there have been enormous advances in the subject, ranging across a number of areas of research — analysis of ice-cores, marine sediments, and lake and bog sediments; stable-isotope stratigraphy; tree-ring analysis; studies of lake-level and other geological features; and the compilation of historical and documentary evidence. In his book, Bradley provides readable and critical reviews of all these topics at a level suitable for undergraduates and research students. He also gives an excellent overview of dating techniques for the Quaternary, the basic requirement for any reliable correlation of past climatic events.

The emphasis throughout is on reconstruction and hence on the descriptive and narrative aspects. There is little on the use of palaeoclimatic reconstructions to test hypotheses about causes of climatic change, for example by providing input parameters for simulations of climatic patterns by global circulation models. Bradley has thus taken a geological rather than a climatological approach, and so discussion of some of the very recent trends in palaeoclimatic research is absent. Indeed the author himself comments that the subject is so huge that "a book purporting to survey the field would have been better written by a team of specialists" (p. ix).

This is exactly what is to found in *Paleoclimate Analysis and Modeling*, in which Hecht has brought together nine contributions by 14 leading authorities. Here is a truly exciting overview, not only of descriptive and narrative palaeoclimatology but also of the new developments in analytical palaeoclimatology involving computer modelling and rigorous testing of hypotheses about causes of long-term climatic change. The contributions are all excellent, and outline relevant methodologies, available databases, and recent applications and reconstructions. They show with great clarity how biostratigraphy and geological evidence can provide the much-needed historical perspective that allows us to appreciate the magnitude of past climatic events in both time and space, and to understand the mechanisms of long-term changes in the past. The emphasis is very much on current research, particularly in the United States. This is an advanced book, and as such will be an invaluable source for all Quaternary scientists.

We can fully expect that future work in Quaternary palaeoclimatology will be as fruitful as that of recent years. These two books will, in their different ways, stimulate and attract students and researchers to the subject, and hence contribute further to the solution of what John Imbrie and Katherine Imbrie have called "the mystery of the ice ages". □

John Birks is in the Botanical Institute, University of Bergen, PO Box 12, N-5014 Bergen, Norway.

Drawing by John Walcott (1754/55–1831) of the rook, together with an outsize representation of the "pernicious grub" on which it feeds (to the overall benefit of farmers, according to Walcott). The illustration is taken from *Bird Etchings: The Illustrators and Their Books, 1655–1855*, by Christine E. Jackson, which includes biographies of sixteen amateur naturalists together with full-page examples of their work in both colour and black-and-white. Publisher is Cornell University Press, price is $55 in the United States, $60.50 in Britain.

IMAGE UNAVAILABLE FOR COPYRIGHT REASONS