

North American fossil vertebrates

Athlon: Essays on Palaeontology in Honour of Lovis Shano Russell. Edited by C. S. Churcher. Pp. 286. (Royal Ontario Museum: Toronto, 1976.) \$15.

THIS *Festschrift* volume honours Dr Lovis Russell, who recently retired as Professor of Geology at Toronto University and Chief Biologist at the Royal Ontario Museum. Nearly all the 16 scientific papers are therefore concerned with aspects of North American vertebrate palaeontology, and over half of them discuss vertebrate morphology and systematics. These papers include the following: Dineley, on the mode of life of the heterostracan fish *Ctenaspis*, which seems to have ploughed through the surface layers of sediment; Olson and Lammers on a labyrinthodont amphibian, which seems to be intermediate between the trimerorhachoids and the brachyopoids; Morris, on the hypsilophodont dinosaur *Thescelosaurus*, prefers Thulborn's classification of the group to Galton's; Green and J. E. Martin revise the didelphid marsupial *Peratherium* of the North American Oligocene and Miocene; Turnbull reconstructs the jaw musculature of the South American sabre-toothed marsupial *Thylacosmilus* and shows that the stabbing action was by the action of the hyper-developed ventral cervical musculature, the relative proportions of the jaw-closing muscles not being of specialised carnivore type; Turner and L. D. Martin describe two new rhinocerotoids from the Oligocene of Nebraska; Hooijer compares the pygmy mammoth of the offshore Californian Channel Islands with other dwarf elephants; Lundelius and Slaughter revise the taxonomy of North American Pleistocene tapirs; and A. E. Wood revises the taxonomy of the Oligocene rodent family Ischyromyridae. Finally, at a somewhat higher phyletic level, Carroll redescribes the South African late Permian younginid genus *Heleosaurus*, which shows many similarities to the little early Triassic archosaur *Euparkeria*. He concludes that younginids may be ancestral to the archosaurs, and that the larger early Triassic archosaurs may represent an early divergent specialisation for a semi-aquatic habitat.

Five of the papers are faunal studies. Madeleine Fritz describes an unusual specimen made up of a series of overgrowths of two ectoproct species on a stromatoporoid base. Holman describes Cenezoic herpetofaunas from Saskatchewan and shows that, although the amphibian fauna of the early Oligocene was already essentially modern, the reptile fauna only became modernised

between then and the late Miocene. Wann Langston suggests that the late Cretaceous Scabby Butte fauna was preserved in a marshier environment that lay closer to the sea than the more varied dinosaur faunas of the Edmonton and Oldman deposits. Storer shows that the Hand Hills Formation of Alberta contains both Mio-Pliocene mammals and Pleistocene mammals, the deposit resulting from glacial reworking and mixing. Finally, Hibbard shows that a stratigraphic confusion between three volcanic ash deposits in Kansas has led to the incorrect placing of the Cudahy Pleistocene fauna in the Yarmouthian instead of the Late Kansan.

In the most general (and therefore most generally interesting) paper, Sloan discusses the ecology of dinosaur extinction in western North America as shown by the replacement of the dinosaur-dominated *Triceratops* fauna by the mammal-dominated *Protungulatum-Stygmimys* fauna that probably immigrated from Asia. He concludes that

there is now good evidence of a major floral change at this time, there being a 45% drop in floral diversity and a 71% loss of plant taxa by extinction over 1–2 Myr. This change from a subtropical angiosperm-based flora to a cooler, temperate, more conifer-dominated flora was, Sloan suggests, due to climatic changes resulting from the retreat of the North American inland sea from the region.

Most of the papers are above-average in interest, the book is well produced and edited, and there are relatively few typographical errors. Even at prevailing rates of exchange, it is not expensive. As with any such collection, the main problem is that most workers will find that, however good the papers are, only a small proportion are relevant to their particular range of interests.

Barry Cox

Barry Cox is Professor of Zoology at King's College, University of London, UK.

Developmental biology

Explorations in Developmental Biology. By C. Fulton and A. O. Klein. Pp. xv+704. (Harvard University: Cambridge, Massachusetts, 1976.) £11.90.

THE authors of this book state that it is unsatisfactory to teach developmental biology through "formal presentation of a body of knowledge to be passively assimilated by students from books and lectures", and claim a novel approach in providing a collection of original papers, grouped in topics and linked by passages which clarify details, provide questions and suggest further reading. There are 59 papers, giving very broad coverage and dating from Spemann and Mangold (1924); but most of them are post-1960. Despite their praise of original papers and scorn for textbooks, the authors provide two text-type chapters (on amphibian embryology and cells in culture), abridge several papers and give an extract from Twitty's delightful *Of Scientists and Salamanders* rather than the original work.

Do any University teachers instruct in the way criticised by Fulton and Klein? The problem lies in balance. Since research papers are often difficult and time consuming to read critically, it is at least efficient to teach mainly by lectures and texts to elementary students, but to swing later to original sources, when the teacher's role becomes to select reading, help in discussion and provide factual background. The book duplicates this role and, of course, cannot keep up with

the latest information as the teacher can.

A good textbook is not an *ex cathedra* statement of the truth. It stimulates by telling what is known, what is uncertain about what is known, what is unknown and how it might come to be known. As a summary of our knowledge, it can cover immense breadth, and at least mention the oddities. A comparison illustrates this. Fulton and Klein take 63 pages to discuss whether the statement that "genes do not change during embryonic development" is a "cornerstone of developmental biology" or a reasonable working hypothesis. Ebert and Sussex's *Interacting Systems in Development* covers the ground in 5 pages and asks more probing questions. So does Berrill's *Developmental Biology*, and adds the unusual case of *Ascaris*. Fulton and Klein make a hardly fair comparison with a brief and misleading paragraph in an introductory general biology text.

Would anyone find the book useful? Probably not those with access to an adequate library, teaching special aspects in tandem with a team of colleagues. For the teacher struggling to cover the field alone, it may prove a godsend. But a warning: in the areas I know best, the choice of papers and some of the linking commentary is idiosyncratic. This is of course the point about University teaching. It is done by individuals whose choice of emphasis provides an essential diversity. Fulton and Klein's course sounds fun, but it isn't mine.

J. R. Downie

Dr Downie is a Lecturer in Zoology at the University of Glasgow, UK.