BOOK REVIEW

E. N. K. Clarkson, *Invertebrate Paleontology and Evolution*, George Allen and Unwin, London, 1979, x + 323 pp., $ 35.00 (cloth), $ 17.95 (paper).

In perusing this new textbook by a respected British paleontologist, I have tried to keep two questions in mind. Is the book successful in fulfilling its intended purpose as "a basic text for undergraduate students reading Geology or Earth Sciences"? Perhaps more important in the context of this journal, is the book to recommend to a chemical evolution worker or astrophysicist interested in acquiring some knowledge of Phanerozoic evolution in the marine realm? The first question is easier to answer than the second.

Pedagogically, *Invertebrate Paleontology and Evolution* has much to recommend it. Clarkson has presented a thorough, up-to-date treatment of the structure and taxonomy of fossilizable invertebrates. Each major group is discussed in a single chapter, and taxonomic information is supplemented by generally clear, concise summaries of the evolutionary history of the group, its stratigraphic value, and its ecological and biogeographic distributions through time. A well chosen, annotated bibliography follows each chapter. A particularly illuminating feature is Clarkson's inclusion of case studies of special interest relevant to each major group. Thus, the chapter on molluscs includes a discussion of S. J. Gould's elucidation of microevolutionary patterns of Pleistocene land snails from Bermuda. Under arthropods, one finds extremely interesting treatments of trilobite locomotion and associated trace fossils, as well as trilobite vision (Clarkson's special province). A concluding chapter presents useful but lamentably brief and sparsely illustrated accounts of three "special faunas" in which soft bodied invertebrates have been preserved: the Cambrian Burgess Shale assemblage, the Devonian Hünstrückschiefer fauna, and the remarkable marine and non-marine fossils of the Pennsylvanian Mazon Creek biota.

Chemical evolution and early microbial life are given scant attention, although brief discussion is accorded to the latest Precambrian Ediacaran metazoans. (Advocates of the serial endosymbiosis hypothesis, beware. Clarkson states as a matter of course that "the earliest animals probably arose from Precambrian algae which lost their chlorophyll".) Perhaps more significantly, he devotes some attention to the very important, but often neglected, assemblages of small, conical remains of primitive molluscs and problematica that are found in latest Precambrian and Cambrian rocks.

Illustration is critically important in a paleontology text, and it is here that the quality of this volume is most variable. Numerous clear, informative figures punctuate the text, but line drawings that are so stylized as to lose their intended message are disappointingly common. Typographical errors, jarring grammatical structures, and, most significantly, incorrect bibliographic references, while not numerous, will annoy the fastidious reader. Clarkson's definitions and usage of the terms *paedomorphosis* and *neoteny* will also disquiet the reader who is familiar with Gould's *Ontogeny and Phylogeny* (cited by Clarkson), as will his tip of the hat to Osborn's finalistic concept of 'aristogenesis'. G. G. Simpson cogently argued nearly thirty years ago that the use of this term be discontinued.

All things considered, a paleontologist may well want to consider this book for adoption in the classroom – in conjunction with the concept oriented *Principles of Paleontology* (Freeman, 1978) by D. M. Raup and S. M. Stanley. So, what about the curious biochemist? He or she can obtain a good feeling for the actors in the evolutionary play by reading this text, although only the most zealous amateur will be enthralled by such details as the differences between conjunct and disjunct pectinirhombs in cystoid echinoderms. For an understanding of the nature of the fossil record and its application to the solution of geological and biological questions, Raup and Stanley is unquestionably the first volume to read. A. Brouwer's short *General Palaeontology* (Oliver and Boyd, 1967) is also useful, particularly his introductory chapter of fossils and fossilization. Other avenues of entry into the discipline are possible, but no single volume currently available covers all

Origins of Life 10 (1980) 405–406. 0302–1688/80/0104–0405 $00.30.

aspects of invertebrate paleontology. For the interested chemist, then, I would prescribe Clarkson's text, Raup and Stanley's '*Principles*', and a weekend spent hammer in hand in the hills surrounding Cincinnati, Ohio, or Girvan, Scotland – all of this to be followed some cold winter's night by a slow and luxurious reading of M. J. S. Rudwick's marvelous *The Meaning of Fossils* (MacDonald and Co., 1972).

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