principles of classification. The main body of the book is devoted to a systematic (albeit brief) summary of useful information about the various orders, starting with agglutinating Foraminifera and ending with the globigerinids. Each chapter gives a survey of morphology and taxonomic principles, phylogeny, stratigraphic applications, and examples from biogeographic and related "ecologic" studies (diversity plots, depth distributions, facies association, and so on). Essentially, Haynes provides a review of basic material that is necessary if, for example, one wishes to show students how to work with fusulinids in the late Paleozoic. The literature cited is extensive and is international in scope. Illustrations range from adequate (line drawings) to excellent (scanning electron micrographs), although coverage is necessarily spotty for those groups that exhibit great diversity.

The book, then, is a utilitarian contribution to the "training" aspect of the micropaleontology profession: it is written with oil geology in mind. The depth of treatment of academic questions—principles of classification and of stratigraphy, and evolutionary theory—is strongly influenced by the utilitarian aspect of the book. Thus, paleobiologists will not find their pet subjects of discussion aired here. The enormous progress of the last dozen years in the quantitative treatment of faunal data, for the purpose of environmental reconstruction, is touched on in the last chapter, on globigerinids. In this chapter, also, stable-isotope analysis is briefly discussed.

In essence, the book reflects the now classic and fruitful marriage of paleontology-stratigraphy with sedimentology-paleoecology, which peaked in the '60's. It should prove valuable for introductory courses in micropaleontology. For a taste of where it's at, however, I would suggest supplementing it with more specialized works covering recent advances in oceanic micropaleontology (for example, R. M. Cline and J. D. Hays, "Investigation of Late Quaternary Paleoceanography and Paleoclimatology," *Geological Society of America Memoir 145* (1976); A. T. S. Ramsay, *Oceanic Micropalaeontology*, vol. 1, Academic Press, 1977; B. U. Haq and A. Boersma, *Introduction to Marine Micropaleontology*, Elsevier, 1978; J. H. Lipps *et al.*, *Foraminiferal Ecology and Paleoecology*, Society of Economic Paleontologists and Mineralogists, 1979).

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Development of Germ Cells

Primordial Germ Cells in the Invertebrates. From Epigenesis to Preformation. PIETER D. NIEUWKOOP and LIEN A. SUTASURYA. Cambridge University Press, New York, 1982. xiv, 258 pp., illus. $59.95. Developmental and Cell Biology Series, 10.

This is the second of two books in which Nieuwkoop and Sutasurya examine the origin and development of the primordial germ cells in the animal kingdom. Having examined the chordates in the companion volume (*Primordial Germ Cells in the Chordates: Embryogenesis and Phylogenesis*, 1979), the authors have now turned to the analysis of the invertebrates. The levels at which this analysis can be carried out in the two animal groups are not entirely comparable. Because the chordates are in fact a rather homogeneous group, the origin and development of germ cells in the phylum can conceivably be analyzed against the background of both phylogeny and embryonic development. On the other hand, the phyla comprised by the invertebrates are so highly heterogeneous as to make possible the analysis of the origin of germ cells in these groups only in the context of their embryonic development. As a result, the invertebrate phyla are arranged according to their taxonomic classification and no attempt is made to correlate them phylogenetically. In spite of these limitations and the disparity of data available in the various invertebrate phyla, the authors have accomplished their goal of providing a comprehensive review of invertebrate germ cell development. The material for each phylum is presented in a rather concise but exhaustive fashion and includes a variety of data on embryonic development, mode of reproduction, and regenerative capacities whenever present.

The picture that emerges shows that primordial germ cells in invertebrates develop according to highly divergent mechanisms. In most primitive invertebrates, the origin of germ cells is basically epigenetic, for they can develop from various types of somatic cells under the inductive influence of some organ anlagen or environmental factors. This is in sharp contrast with higher invertebrates, where cell-specific germ plasm and early segregation from somatic cells make the development of germ cells strongly preformistic. An "intermediate" mode of germ cell development can also be envisioned in those invertebrate phyla—annelids, echinoderms, and mollusks—in which segregation of germ cells from previously somatically committed cells occurs rather late in embryonic development. The evidence gathered in the book leads to the unavoidable conclusion that the classic distinction between germen and soma drawn from Weismann's *Keimplasma* theory is no longer tenable. In opposition to the old-fashioned idea of an immortal germ line, Nieuwkoop and Sutasurya propose that germ cell development is a special mode of cell differentiation in which the acquisition of a differentiated state does not ultimately result in loss of totipotentiality.

Looked at from this standpoint, the development of germ cells has a much wide contour than had previously been assumed, so as to include all cells that may potentially develop into germ cells.

On the whole the book appears to be a well-balanced survey of the wide mass of data available on the subject. The reader interested in this literature will appreciate the effort put forth by the authors to present a unifying view of a controversial topic.

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Olmec Archeology

The Olmec and Their Neighbors. Essays in Memory of Matthew W. Stirling. Michael D. Coe and David Grove, organizers. ELIZABETH P. BENSON, Ed. Dumbarton Oaks Research Library and Collections, Washington, D.C., 1981. xii, 346 pp., illus. $30.

By following up the explorations of his predecessors in the jungles of southern Mexico, uncovering numerous additional monumental sculptures, finding some spectacular jade offerings, and popularizing his adventures in the pages of the *National Geographic*, the late Matthew W. Stirling was single-handedly responsible for the greatest surge of enthusiastic interest that Olmec archeology has yet received. The organizers of this volume have gathered a score of essays honoring his memory, presenting them under a title for whose inspiration they turned to the famous festschrift for the Mayanist A. M. Tozzer. The essays are mainly of interest to the academic specialist, but several have more general interest and broader significance. My remarks here are directed toward two whose subject matter is particularly familiar.

Olmec sculpture was a focus of Stirling's explorations, and fine Olmec art