of any sort on Neogene planktonic foraminifera. The book must lie within easy reach of a specialist's microscope. And it is designed to be used—plenty of room is left to insert notes and update material. This book will be a new starting point for planktonic foraminiferal studies, and no one will be able to work in Neogene biostratigraphy, paleoceanography, paleoclimatology, biogeography, or, one hopes, evolutionary studies without it.

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Fertilization

Mechanism and Control of Animal Fertilization. JOHN F. HARTMANN, Ed. Academic Press, New York, 1983. xii, 563 pp., illus. $69. Cell Biology.

Several excellent reviews on various aspects of fertilization have appeared in the past decade, but this book is the most complete work on the subject since the now classic two-volume treatise, *Fertilization*, edited by Charles B. Metz and Alberto Monroy, was published in 1967.

Has much progress been made in research on the mechanism of sperm-egg interaction and early embryogenesis since 1967? The answer is definitely affirmative. During the past 16 years, and especially in the last eight years, there has been an explosive expansion of our knowledge of the biochemistry and cell biology of gamete interaction and the activation of embryonic development. Today there are more researchers working on fertilization-related problems than at any time in the past. The major underlying reasons for this expansion are the development of microanalytical techniques of biochemistry and immunology that permit analysis of the small number of eggs obtainable from mice and other mammals and the great interest in the fertilization of human eggs in vitro.

The first four chapters deal with biochemistry and macromolecular synthesis during mammalian oogenesis (P. M. Wassarman), spermatogenesis (A. R. Bellvé and D. A. O'Brien), the egg zona pellucida (B. S. Dunbar), and the capacitation reactions of sperm (E. D. Clegg).

Although most basic discoveries of the mechanisms of animal fertilization have utilized the gametes of marine invertebrates such as the sea urchin, only two chapters are devoted to invertebrate fertilization. Chapter 5 (S. S. Shen) reviews the electrobiology of sea urchin and echiurid eggs, covering both the properties of the egg membrane and the roles of intracellular ion fluxes in the activation of embryonic development. This is a valuable contribution because the clarity of writing and organization make what some find a difficult subject easy to understand. Chapter 6 (A. C. Lopo) summarizes knowledge of sperm-egg attachment in sea urchins and other invertebrates such as decapods and ascidians. The emphasis is on the mechanism of induction of the acrosome reaction and the description of the proteins of the sperm plasma membrane, the acrosome granule, and the egg surface that mediate surface recognition between the gametes.

Chapter 7 (J. F. Hartmann) returns to mammals, describing the process of gamete interactions, especially the different types of sperm-egg adhesions observed in vitro. Although chapter 4 deals exclusively with sperm capacitation, chapters 7 and 10 go into some depth again on this subject, creating some overlap and redundancy. Chapter 8 (E. D. Schmell, B. J. Guylyas, and J. L. Hedrick) compares the surface alterations and blocks to polyspermy in eggs of sea urchins, frogs, and mammals. The roles of the structural proteins and enzymes of the egg cortical granules are considered in depth. This is an excellent comparative analysis of polyspermy prevention in these three animal groups. Chapter 9 (D. J. Wolgemuth) summarizes all available information on changes in gamete pronuclei and macromolecular syntheses known in eggs of the mouse, rat, hamster, rabbit, and human. The final two chapters, on gamete interactions in the female (H. D. M. Moore and J. M. Bedford) and sperm and egg transport in the female (J. W. Overstreet), would be the most interesting ones for clinicians entering into human in vitro fertilization.

The only negative features of the book are the dearth of illustrations in some chapters and the poor quality of reproduction of some micrographs. Two chapters on invertebrates do not go well with the nine on mammals; chapters on embryo transfer and human fertilization in vitro would have been better choices.

On balance this is a worthwhile book. The reference lists are up to date and extensive, and the index is fairly complete. The book will be an excellent reference source.

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Books Received

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The Adipocyte and Obesity. Cellular and Molecular Mechanisms. Papers from a conference, Toronto, June 1982. Aubie Angel, Charles H. Hollenberg, and Daniel A. K. Roncari, Eds. Raven, New York, 1983. xviii, 310 pp., illus. $35.

Biothermodynamics. The Study of Biochemical Processes at Equilibrium. J. T. Edsall and H. Gutfreund. Wiley, New York, 1983. xiv, 248 pp., illus. $34.95. Monographs in Molecular Biophysics and Biochemistry.

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The New Biology and Medical Education. Merging the Biological, Information, and Cognitive Sciences. Papers from a conference, June 1982. Charles P. Friedman and Elizabeth F. Purcell, Eds. Josiah Macy, Jr. Foundation, New York, 1983 (distributor, Independent Publishers Group, Port Washington, N.Y.). xx, 322 pp. Paper, $15.

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