Embryology

The Biology of the Blastocyst. Papers from a symposium, Lake Wilderness, Wash., July 1969. R. J. BLANDAU, Ed. University of Chicago Press, Chicago, 1971. xiv, 560 pp., illus. $27.50.

This book is a companion volume to *The Mammalian Oviduct*, also proceedings of an international symposium, published two years earlier under the editorship of Hafez and Blandau. The scope of the book is broader than the title implies: it deals not only with the blastocyst but with various aspects of development prior to implantation as well as the blastocyst-uterine relationship around the time of implantation. Although the contributions—of which there are 31—are not grouped into separate sections, they concentrate themselves around three main themes.

The most numerous group of papers is concerned primarily with the embryo itself. The metabolism and the biochemical constitution of eggs and blastocysts receive the most thorough consideration. Another fruitful and rapidly developing approach, ultrastructural research, is represented only by two contributions and I was therefore left unsatisfied. The quality of these two papers is a compensating factor, however. In one of them Enders reviews the evolution of the cellular ultrastructure from zygote to blastocyst in comparative terms (unfortunately the number of species that have been investigated so far is very small), and in the other Szollosi takes up the important question of the morphological basis of RNA synthesis during cleavage. From the biochemical point of view this problem is reviewed by Brinster (with references brought up to 1970). This appears to be an exciting field of research, the more so because from the information already available it is evident that the mammalian embryo differs greatly in its pattern of RNA synthesis from the "classical" embryos of amphibians and sea urchins. The paper on fertilization in vitro would fit better in the previous volume, *The Mammalian Oviduct*, which in turn should be consulted for a brief—perhaps too brief—description of the contribution of experimental embryology.

The second group of papers is concerned with blastocyst-uterine interactions before implantation—migration, spacing, orientation, and so on—and during actual implantation. Hormonal control of the process and some aspects of the metabolism of the endometrium are also discussed. I regret the absence here of more information on the relationship between trophoblast and uterine epithelium at the ultrastructural level and on biochemical (including histochemical) changes occurring in the epithelium and the endometrium at the implantation site.

The third group of papers deals with immunological aspects of pregnancy and the peculiarities of the trophoblast, that odd tissue thanks to which our embryonic development ends in birth rather than hatching.

Being a collection of reports prepared by many people, this volume, like any proceedings, is not uniform. The weight and character of the contributions vary—some are thorough reviews, others describe restricted investigations or signal new methods and approaches, often not published before. In each symposium contributions of the latter type are a refreshing condiment in a meal of retrospective discussion. It would be unfortunate, however, if proceedings were to take the place of specialist journals, where—for the benefit of the authors and the flow of scientific information—the original pieces of work should have their primary publication.

I do not doubt that the book will turn out to be very useful. On seeing it one of my young collaborators commented shortly, "A new bible."

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Aquatic Life

Marine Ecology. A Comprehensive, Integrated Treatise on Life in Oceans and Coastal Waters. OTTO KINNE, Ed. Vol. 1, Environmental Factors. Part 1. Wiley-Interscience, New York, 1970. xvi, 682 pp., illus. $34.50.

This book is only the first part of the first volume, and since it runs to 682 pages the treatise does indeed promise to be comprehensive.

Part 1 of the first volume is in three sections: one on the oceans as a life-supporting environment, one on light, and one on temperature. As the editor states in his introduction, such a work cannot be written by a single author. In this first part we have 11.

Part of the editor's method of making the work comprehensive is to try to divide the subject into mutually exclusive parts which will together omit no part of the whole. He has divided the environment into factors starting with the two included in this first part and going on in two future volumes to salinity, water movement, and so on for a total of ten. A final chapter will cover factor combinations. Each chapter is written by several authors, as in the chapter on light, which is divided into a general introduction, a section on bacteria, fungi, and blue-green algae, one on higher plants, one on invertebrates, and one on fishes. While the division by taxa works well (although the reader may notice that vertebrates other than fishes are ignored), the division into factors cannot be and is not completely followed. The authors find it necessary time and again to deal with interactions of several factors.

One of my strongest criticisms of the treatise is of just this division into factors. I find sections of the work very dull because of this self-imposed necessity to proceed from one aspect of the effects of a factor on an organism to another until the subject is exhausted and so is the reader. Except for the editor, I may be the only person who has read the book through and could only expect to find it tedious. But my feeling is that a book on marine ecology, whether an in-depth study or an introduction to the subject, could be readable.

The treatise, except for the first chapter, is not an introduction but a collection of reviews organized around an outline that, though I find it pedantic, at least offers the editor the hope of covering the subject with some completeness. The reviews are better organized and easier to follow as their subjects become more limited. The writers on fishes seem to be the most familiar with their literature and to have had their whole subject in mind as they wrote. Their sections are, in my opinion, the best done and as readable as can be hoped for in comprehensive reviews. Some of the other authors seem less at home with parts of their material. Their results are much harder to follow, although as far as I can judge the literature review is good.

The first chapter is the most disappointing. Here I hoped for some generalizations, a setting of the stage for the rest of the treatise, a readable introduction to the important ways in which the ocean affects life within it, Instead there is a sort of taxonomic

approach, listing and labeling parts of the ocean, its currents, water masses, edges, and so on. The latter part, on chemical cycles in the ocean, is better. But there is no general discussion of the importance to living things of the scarcity of life in most of the sea, of the continuous motion of the medium, of the constancy of the environment in most of the ocean, or of the importance of gravity in a fluid medium compared with a solid substratum.

An enormous amount of work has obviously gone into the treatise and will continue to go into it. It is generally successful as a comprehensive review of what is known about marine ecology, but this collection of knowledge belongs in institutional libraries, not on personal bookshelves.

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Particles and Flow

Hydraulics of Sediment Transport. WALTER HANS GRAF. McGraw-Hill, New York, 1971. xii, 514 pp., illus. $22.50. McGraw-Hill Series in Water Resources and Environmental Engineering.

Although this is basically an engineering textbook, it provides a first-rate review of the literature (682 references) and therefore should be a valuable sourcebook for scientists.

Part 1 is a short history (23 pages) of sediment transport starting about 7200 years ago, part 2 is an introduction (43 pages) to the hydrodynamics of fluid-particle systems, part 3 is a detailed treatment (346 pages) of sediment transport in open channels, and part 4 deals with sediment transport in closed pipes. The development is mathematical throughout. The apparent (or typographical) organization is excellent, with topics and subtopics numbered, in a modified decimal system, down almost to the paragraph level.

Despite the fact that the treatment is basically historical, the text is not ideal for the beginner. For example, the von Kármán vortex street is mentioned without definition on page 41, there is no listing of von Kármán (or Kármán) in the indexes, and there is no treatment of this phenomenon prior to page 41.

The author reviews the problem of the settling velocity of particles, pointing out the failure of *all* physically based efforts to make verifiable predictions at Reynolds numbers above 2. He discusses various complicating effects but seems not to be aware of self-induced particle rotation (due to a phenomenon which is essentially the von Kármán vortex street) and its effects on nearby grains. He attacks the problem of using "average velocity" to represent the flow and to predict the scour, points out that "bed velocity" is generally not available, and shows that the natural historical development has been to turn to the "bottom shear stress" as a good substitute. Kalinske's important observation, that velocity fluctuations are critical, is reported but not exploited; the reviewer feels that this is the direction that sediment-transport research must now take.

Graf is aware (also from Kalinske's work) that saltation is unimportant in water, a fact overlooked by many a textbook writer. He treats the "lift" problem in fair detail, without recourse to saltation, but also without providing a satisfactory mechanism. His discussion of the "regime" (equilibrium) concept leans heavily on work by Blench and a summary by Leopold *et al.* Meandering is treated in light of the fact—apparently not appreciated by very many persons—that bed load is not necessary for initiation, but no clear-cut principle emerges. The river profile is analyzed in terms of the simplest cases only. A good presentation of modeling and model laws is given.

Overall, this book is a fine summary of sediment transport, strong in both mathematics and historical sequence, but it breaks no new ground, and it rarely even points in the direction that research might go.

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Books Received

Advanced Strength of Materials. Enrico Volterra and J. H. Gaines. Prentice-Hall, Englewood Cliffs, N.J., 1971. xx, 522 pp., illus. $17.50.

Advances in Carbohydrate Chemistry and Biochemistry. R. Stuart Tipson and Derek Horton, Eds. Academic Press, New York, 1970. xiv, 544 pp., illus. $26.

Advances in Heat Transfer. Vol. 7. Thomas F. Irvine, Jr., and James P. Hartnett. Academic Press, New York, 1971. xiv, 394 pp., illus. $22.

Advances in Stereoencephalotomy. Vol. 5, Extrapyramidal, Sensory, Convulsive and Behavioral Disorders: Recent Techniques. Proceedings of a symposium, New York, September 1969. E. A. Spiegel and H. T. Wycis, Eds. Karger, New York, 1970 (U.S. distributor, Phiebig, White Plains, N.Y.). vi + pp. 71–380, illus. Papre, $19. Reprint of *Confinia Neurologica,* vol. 32, No. 205, 1970.

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Analytical Techniques in the Theory of Guided Waves. R. Mittra and S. W. Lee. Macmillan, New York, 1971. xii, 302 pp., illus. $10.95.

The Animal and the Environment. F. John Vernberg and Winona B. Vernberg. Holt Rinehart and Winston, New York, 1971. xviii, 398 pp., illus. $9.95.

Animal Variety. Lawrence S. Dillon. Brown, Dubuque, Iowa, ed. 2, 1971. viii, 164 pp., illus. Paper, $2.75.

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Beyond the Automobile. Reshaping the Transportation Environment. Tabor R. Stone. Prentice-Hall, Englewood Cliffs, N.J., 1971. xii, 148 pp., illus. Cloth, $5.95; paper, $2.45.

Biochimie. Etudes Médicales et Biologiques. Jacques Kruh. Hermann, Paris, 1971. 502 pp., illus. Paper, 48 F. Collection Méthodes.

Bioethics. Bridge to the Future. Van Rensselaer Potter. Prentice-Hall, Englewood Cliffs, N.J., 1971. xviii, 206 pp., illus. Cloth, $5.95; paper, $3.95.

Biology in the World of the Future. Hal Hellman. Evans, New York, 1971 (distributor, Lippincott, Philadelphia). iv, 188 pp., illus. $4.95.

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