to the work of the Nieuwkoop group) by a partial transformation of the ectoderm through an interaction with endoderm cells. This mechanism is thoroughly epigenetic and somewhat later in its inception and is the mechanism elected by the salamanders and their allies among the Amphibia, and probably by the mammals as well. The primordial germ cells of these groups are not characterized by a germ plasm but contain cytoplasmic structures collectively termed "nuage" that have been suggested to be related to some elements of the germ plasm.

Because the Amphibia appear to employ both mechanisms, the monograph gives interesting consideration to the possibility that the class, and perhaps the entire subphylum Vertebrata, has a diphyletic origin. A problem with such interpretations lies in the rudimentary state of our knowledge of the origin of the primordial germ cells in the fish and reptiles. We have confidence in our understanding of critical events in amphibian and bird development, but the possibility cannot yet be excluded that similar variation in the history of the primordial germ cells occurs in the other vertebrate groups; the need for further research into this question is clearly signaled in the book. Moreover, the book limits its compass to the Chordata, and differences similar to those reviewed in it may also be found within the invertebrate groups. Such differences may represent divergences along the main lines of evolution of all principal animal groups.

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Reproductive Biology

The Spermatozoon. Maturation, Motility, Surface Properties and Comparative Aspects. Proceedings of a symposium, Boston and Woods Hole, Mass., May 1978. DON W. FAWCETT and J. MICHAEL BEDFORD, Eds. Urban and Schwarzenberg, Baltimore, 1979. xvi, 442 pp., illus. $49.

Spermatozoa are one of the most highly differentiated cell types. They are specialized to perform one short act: the fusion with an ovum, which restores the diploid genome and activates embryonic development. Until recently, our knowledge of the membrane ultrastructure and biochemistry of sperm has been scant. Most of the significant recent work on sperm physiology, biochemistry, and ultrastructure has been compiled in this very readable and beautifully illustrated volume. The book will be a major reference in reproductive biology for years to come.

The book is a collection of 40 papers presented at the third international symposium on the spermatozoon. The papers are divided into six major sections, on maturation, motility, surface properties, comparative aspects, isolation of germ cells, and quantitation of sperm motility. There are 333 figures, many of which are excellent high-resolution electron micrographs, illustrating the intricacies of sperm anatomy. In a paper on the basis of flagellar motility (P. Satir) the appearance of the dynein arms of the axoneme (p. 86) neatly demonstrates the value of the technique of reinforcement of the image of a periodically repeating structure. A companion paper devoted to the ultrastructure of the axoneme (R. W. Linck) presents beautiful negatively stained images showing the radial spoke triplets (p. 101). The distribution and patterning of intramembraneous particles on sperm flagellar membranes (D. S. Friend *et al.*), as visualized by freeze-fracture (pp. 160–165), are most impressive. A paper on the morphology of urodelian sperm (B. Picheral) presents one of the most extensive studies of amphibian sperm yet accomplished.

The quality of the art work in the book is consistently excellent. It is amply demonstrated in a paper on the evolution of the acrosome complex (B. Baccetti), where illustrations of such fantastic sperm as those belonging to the diplopod *Packyjulus* (p. 317) appear. The quality of the printing and the general layout, organization, and balance of content are all without fault. In fact, the only detracting feature is that the subject index is rather short.

Sperm-egg recognition, adhesion, and fusion are processes that must be mediated by macromolecular components on the cell membranes. Many laboratories are currently attempting to isolate these important molecules from both invertebrate and vertebrate spermatozoa. For this reason, the section on surface properties, the major section of the book, is timely and of considerable importance. Mammalian sperm taken from the testis or the caput portion of the epididymis are incapable of fertilization. Only those sperm that have passed from the caput to the caudal portion of the epididymis can fertilize eggs. G. L. Nicolson and R. Yanagimachi review their work demonstrating that as sperm pass from caput to caudal portions, the lectin binding specificity changes. This shows that new glycoproteins, which may be intimately involved in capacitation and the acrosome reaction, must appear on the sperm membrane during epididymal maturation. Another paper (C. F. Millette) describes the appearance of membrane antigens during mouse spermatogenesis. A third paper (M. G. O'Rand) is concerned with antigenic changes occurring during the still mysterious process of sperm capacitation.

The surprising finding that sperm membrane components persist on the surface of both sea urchin and hamster eggs as distinct patches is described, along with a novel method of labeling sperm using ^{125}I-labeled diiodofluorescein-isothiocyanate (C. A. Gabel *et al.*). A paper (G. B. Dooher) on the serological analysis of T/t antigens (surface antigens) on mouse sperm is also included. Useful methodology, such as the isolations of components of rat sperm (H. I. Calvin), the perforatorium of rat sperm (G. E. Olsen), and mitochondria from bovine sperm (V. Pallini), is presented.

This is a welcome and refreshing treatise. One hopes it may stimulate young investigators to enter this field of research.

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Books Received

Acoustic Tumors. William F. House and Charles M. Luetje, Eds. University Park Press, Baltimore, 1979. Two volumes. illus. Vol. 1, Diagnosis. xviii, 298 pp. $29.50. Vol. 2, Management. xvi, 280 pp. $19.50.

Additive and Cancellative Interacting Particle Systems.. David Griffeath. Springer-Verlag, New York, 1979. vi, 108 pp. Paper, $9. Lecture Notes in Mathematics, vol. 724.

Adjuvant Therapies and Markers of Post-Surgical Minimal Residual Disease II. Adjuvant Therapies of the Various Primary Tumors. Papers from a meeting, Paris, June 1978. G. Bonadonna, G. Mathé, and S. E. Salmon, Eds. Springer-Verlag, New York, 1979. xii, 468 pp., illus. $53.90. Recent Results in Cancer Research, 68.

Birth Defects Compendium. Daniel Bergsma, Ed. Published for the National Foundation—March of Dimes by Liss, New York, ed. 2, 1979. xxxviii, 1184 pp., illus. $50.

Biting Off the Bracelet. A Study of Children in Hospitals. Ann Hill Beuf. University of Pennsylvania Press, Philadelphia, 1979. x, 164 pp. $9.95.

Brain, Environment, and Social Psychology. J. K. Chadwick-Jones, Irmingard I. Lenzer, James A. Darley, and Kenneth A. Hill. University Park Press, Baltimore, 1979. xii, 202 pp., illus. Paper, $8.95.

Captivity and Behavior. Primates in Breeding Colonies, Laboratories, and Zoos. Papers from a symposium, Seattle, Wash., 1977. J.

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