The Mollusca

Pathways in Malacology. Papers from a congress, Amsterdam, Aug. 1977. S. VAN DER SPOEL, A. C. VAN BRUGGEN, and J. LEVER, Eds. Bohn, Scheltema and Holkema, Utrecht, and Junk, The Hague, 1979. vi, 296 pp., illus. $72.

The basic mollusk body plan, originating in Precambrian time, combined a distinctive complex of adaptive characteristics and initiated one of the major success stories of animal evolution. Comprising a soft, unsegmented body with dorsal shell and a secondary dorsal-ventral axis, superimposed on the major anterior-posterior axis, the molluscan theme proved both adaptable and plastic. Its variations radiated in time and in geographic and habitat space, so that in number of species and structural diversity mollusks are now among the most successful types of animals.

Thus mollusks have always provided rich material for comparative biological study. *Pathways in Malacology* explores developmental, physiological, and biochemical pathways leading to some of the complex structures, functions, and behaviors that characterize the second largest phylum. The authors of its most successful chapters took the book's title most seriously, reviewing the dynamics of life processes and interpreting the present status of knowledge of their control mechanisms.

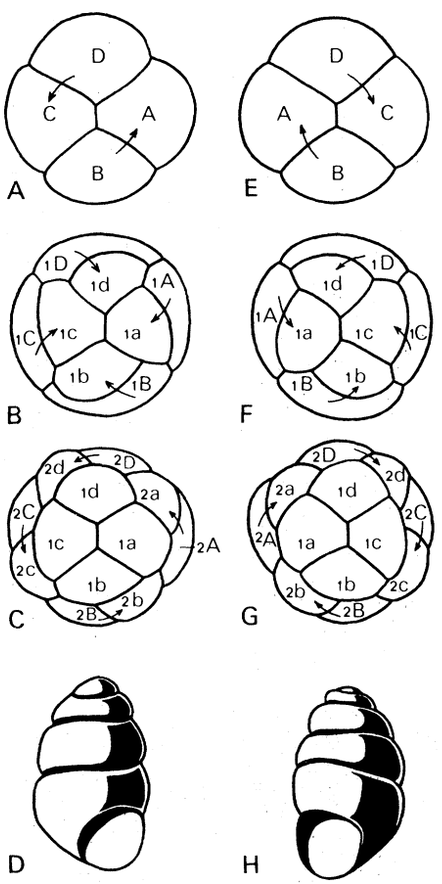
Two authors follow the ontogeny of the characteristic asymmetry of gastropods, attempting to show how it develops from the bilateral bauplan. J. Lever adds a new twist to theories of torsion, and N. H. Verdonk reviews evidence supporting the hypothesis that events initiated in the left quadrant of the four-cell embryo may lead directly to torsion.

A. S. M. Saleuddin thoroughly reviews the formation, structure, and role of the periostracum, the organic outermost layer of the shell. His model of transport of precursor molecules from hemolymph through epidermal cells to the outside world identifies similarities with insect cuticle secretion, and he reviews new information on sensory cells and the innervation of the periostracum-producing epithelium.

When disturbed, a snail typically withdraws the shell-secreting mantle as well as the body into its shell. When danger passes or conditions improve, it must reposition the mantle exactly in order to continue shell growth. Saleuddin identifies neural pathways in the mantle that may regulate this and other aspects of shell production. Neurophysiological studies may provide the next major advance in understanding of general biomineralization processes, to which the study of molluscan shell has already contributed a great deal. Here comparative studies of bivalves should be of interest, because their mantles have less freedom of movement, being fixed to the shell by a muscle near the growing edge.

Bivalves are the mollusks most successful at occupying sea-floor sediments. J. Knudsen relates mode of reproduction, distribution, physiological tolerance, genetic variability, and species diversity of abyssal zone bivalves. Because the sea floor at abyssal depths occupies half the earth's surface area, its poorly known biota deserves entrée into the mainstream of modern biology.

Attachment by calcareous secretion has enabled some bivalves to return to hard surfaces, probably the primitive molluscan habitat. The grand master of the mollusks, C. M. Yonge, who in the past half century has contributed more to knowledge of the phylum than any other person, reviews cementation in bivalves, lucidly clarifying its independent origins and the importance of the transient foot and the periostracum in cementation processes.



"Diagram comparing the development of dextral [*A–D*] and sinistral [*E–H*] snails. Dextral snails originate from eggs with dexiotropic cleavage and a clockwise arrangement of the quadrants, sinistral snails from eggs with laeotropic cleavage and an anti-clockwise arrangement of the quadrants." [From N. H. Verdonk, "Symmetry and asymmetry in the embryonic development of molluscs," in *Pathways in Malacology*]

Mollusks with large external shells live in very different perceptual worlds from their softer and more complex brethren, the shell-less cephalopods. M. J. Wells reviews the capacities and constraints of learning in octopus and shows that whereas its visual world is much like ours its tactile world differs greatly, largely because it is much more difficult for a soft cephalopod to attain a sense of body position than it is for an animal that can monitor the joints of rigid appendages and the angles between them.

The remaining chapters review energy metabolism and endocrinology in mollusks, the use of planktonic gastropods as indicators of water masses, and the historical biogeography of land snails. Finally, in the only chapter concerning direct human-mollusk relationships, E. A. Malek evaluates the present use of chemical molluscicides to control the snail-borne disease schistosomiasis, estimated to affect 200 million people.

The invited authors of this book were asked to review the present status of knowledge of important aspects of malacology, originally in lectures to a congress of the Unitas Malacologica Europaea. The volume fulfills its purpose; most of the reviews are lucid and compact and meet the standards of regularly issued review volumes.

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Books Received

Advances in X-Ray Analysis. Vol. 22. Proceedings of a conference, Denver, Aug. 1978. Gregory J. McCarthy, Charles S. Barrett, Donald E. Leyden, John B. Newkirk, and Clayton O. Ruud, Eds. Plenum, New York, 1979. xviii, 492 pp., illus. $42.50.

An African Dam. Ecological Survey of the Kamburu/Gtaru Hydro-electric Dam Area, Kenya. R. S. Odingo, Ed. Swedish Natural Science Research Council, Stockholm, 1979. 184 pp., illus. Paper, $10. Ecological Bulletins No. 29.

Albert Einstein. His Influence on Physics, Philosophy and Politics. Peter C. Aichelburg and Roman U. Sexl, Eds. Vieweg, Braunschweig, Germany, 1979. xvi, 220 pp., illus. DM 48.

Boswell's Clap and Other Essays. Medical Analyses of Literary Men's Afflictions. William B. Ober. Southern Illinois University Press, Carbondale, and Feffer and Simons, London, 1979. xviii, 292 pp., illus. $17.50.

Botanische Versuche und Beobachtungen mit einfachen Mitteln. Ein Experimentierbuch