Book Reviews

Jawless Vertebrates

The Biology of Lampreys. Vol. 1. M. W. HARDISTY and I. C. POTTER, Eds. Academic Press, New York, 1971. xiv, 424 pp., illus. $22.50.

As the closest living relatives of the earliest known vertebrates and the systematic group most distantly related to all of today's jawed forms, the lampreys and hagfishes have great potential value in both general and comparative biology. The contributions that studies on these jawless and otherwise strikingly different fishes could make are still mostly unrealized, because only within the past decade have biologists begun to give them the attention they deserve. Even the devastating invasion and spread of the sea lamprey through the Great Lakes resulted solely in investigations directly concerned with its control: a modicum of population biology and a great deal of larval toxicology. This two-volume series on *The Biology of Lampreys* is an expression of the growing interest of ichthyologists and comparative physiologists and will surely accelerate it.

To judge from their execution of the first volume (as well as the table of contents of the second), the editors have put together a compendium that truly lives up to its title with its extended treatment of the systematics, evolution, ontogeny, ecology, behavior, and physiology of the lampreys. Moreover, the book is exceptionally well integrated and has liberal cross-indexing throughout. That the editors wrote or coauthored six of the nine chapters has undoubtedly helped unify it.

Hardisty and Potter are well known for their studies on the lampreys of the northern and southern hemispheres, respectively, and they have selected outstanding, currently active authorities to assist them. Carl L. Hubbs, who has been making significant contributions to our knowledge of lampreys for more than half a century, has helped present a comprehensive review of the systematic relationships and geographic distribution of the 31 species of living lampreys. David Bardack and Rainer Zengerl, who recently described the first and only fossil lamprey known, have expanded that description and discussed the evolution of the group. E. S. Robinson and George W. Piavis have contributed their specialties, lamprey karyology and embryology, and B. R. Smith, long associated with sea lamprey control in the Great Lakes, has reviewed the history of this effort. Detailed accounts of ecology, complicated life histories, and unusual sexual development of lampreys are provided by the editors themselves.

Fascinating questions about the speciation, migrations, and metamorphosis of the lampreys are broached in this book, but the most interesting question of all, and by far the most difficult to answer, is, of necessity, only touched upon: In what ways and to what extent have the living lampreys retained the structures and functions of the earliest vertebrates?

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Cellular Processes

The Biology of the Cell Cycle. J. M. MITCHISON. Cambridge University Press, New York, 1972. vi, 314 pp., illus. Cloth, $14.50; paper, $4.95.

A major aim of this book, which grew out of a graduate course Mitchison taught at the University of California at Berkeley in 1969, was to "provide a reasonably comprehensive survey of work on the cell cycle from bacteria to mammalian cells, with the main emphasis being on patterns of synthesis and their control." I think this goal has been achieved in admirable fashion.

Coverage in the first nine chapters includes methods used to study the cycle and consideration of the variables which have been measured, such as the synthesis of nucleic acids and proteins, growth patterns, changes in cell organelles, and problems of pools and uptake. The author integrates a wealth of material from diverse areas of biology, pointing out gaps in our knowledge, suggesting new experiments and new avenues of approach.

The tenth and final chapter, entitled "The control of division," deserves separate mention. It begins with a detailed analysis of heat-shock synchrony in *Tetrahymena* as studied by Zeuthen and his co-workers because this "is the only case of induction synchrony where there is a well-developed theory, with experimental backing, on the mechanisms that control division in individual cells and cause division synchrony in cell populations." With this as background Mitchison develops a series of models for division control and then examines the relationship of data from a variety of biological systems to the models and to the findings in *Tetrahymena.*

A number of subjects one might expect to find treated in a survey of the cell cycle were omitted, but this was by intent rather than neglect. In particular, mitosis and cleavage are not included because "they have been so well analyzed in the review by Mazia (1961)." This, I think, points up the long-range value of certain kinds of reviews. Those, such as *The Biology of the Cell Cycle*, which are thoughtful and relate new findings to the total pool of available information from all types of organisms will not suffer early obsolescence.

The writing style is lucid and often conversational in tone, and there are some unusual features in format which enhance its value and make it easier to use. One is the addition of a postscript at the end of the book in which findings published after the body of the book was written are presented chapter by chapter and placed in the context of earlier discussions. Also, the extensive bibliography (over 1000 entries) includes the numbers of the pages on which the references are cited, in a sense combining the functions of bibliographies and author indexes into one unit.

The book seems well suited for use in a graduate course, which is not surprising considering the way in which it was developed, and may stimulate more people to teach courses along these lines. However, its potential utility is much broader than this. I think it will