

## Evolution

### GRZIMEK'S ENCYCLOPEDIA OF EVOLUTION

by Bernhard Grzimek, ed. 1976. Van Nostrand Reinhold (450 West 33rd Street, New York 10001). 559 p. \$39.50.

The question of whether a book can be judged by its cover not settled by this volume. The title, which indicates an encyclopedic coverage of the topic of evolution, is misleading. However, the photograph of a Paleozoic gastropod which appears on the dust jacket does reflect the content. The emphasis is on phylogeny and paleontology.

This is an edited compendium of the work of over 200 experts from around the world but primarily the contributors are German—the language from which the work has been translated into English. This volume is a companion to a 13 volume *Animal Life Encyclopedia* and two accompanying volumes—one on ecology and one on ethology. Together, the sequence forms a formidable library of what has come to be regarded as traditional or classical biological content.

Although this is called an encyclopedia of evolution, the major emphasis is on animals. The plants receive short shrift on pages 142-161, and only are referred to incidentally elsewhere. The origin of life is encompassed on pages 93-109. The book is lucid and accurate in its classic coverage, but one is left with the feeling that the editor has ignored the contribution of most evolution-related disciplines since about 1920. Genetics, for example, is not even mentioned in the index nor is DNA, mitosis, or meiosis. The mechanisms for evolution are absent, but its pathways and evidences, particularly from the geological record, are dealt with in considerable detail. Far from being an encyclopedia of evolution in the comprehensive sense, the work is selectively concentrated on morphology and systematics as determining evolutionary progress through time. In evolutionary terms this is somewhat of a dinosaur of a book—large and Mesozoic in emphasis.

Belying the comprehensiveness usually associated with the term encyclopedia are omissions that seem arbitrary. For example, in the coverage of human evolution no mention is made of the Piltown hoax. If one encountered the name "*Zinjanthropus*" elsewhere and looked to this encyclopedia for elucidation, reference to this provisionally named australopithecine is absent. Systematic terminology, however, is present to the point of making certain sections comprehensible only to those who possess arcane knowledge. An example from page 307 of a not atypical

sentence is "The parkinsonians, macrocephalites, and reineckeians were typical ammonite families of the Tethys and its bordering areas in the upper Middle Jurassic, while the perisphincts and opelians were characteristic groups in the Upper Jurassic."

The work is handsomely illustrated with both black-and-white drawings and full color pages. A nongermanic five page appendix is devoted to conversion of metric units to English ones. Lyell and Darwin would be much at home reading this work. It is dubious that Avery, Watson, or Nirenberg would feel it properly reflective of today's comprehension of the evolutionary process.

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### THE SCIENCE OF EVOLUTION

by William D. Stansfield. 1977. Macmillan Publishing Company, Inc. (866 Third Avenue, New York 10022). 614 p. \$14.95.

William Stansfield has written quite a book! The selection of topics is judicious and the coverage is detailed. The book ranges from a sketch of the history of evolutionary thought through the origin of life, the fossil record, the mechanisms of heredity, the dynamics of populations and the selection forces at work in those populations through to the generation of taxa and the evolution of man. The book is well illustrated and contains many photos of the people who have been instrumental in the thinking and research which makes a science of evolution possible. There are pithy discussion questions at the end of each chapter. Finally, 306 references and a carefully prepared index complete the book. All in all, a fine piece of workmanship.

Therein lies the rub. It may be too fine, too comprehensive, and too detailed for the audience of college sophomores it is intended to serve. The author makes it clear in the preface that "...mastery of this subject usually requires that it be thoroughly studied. . . ." I agree. I have been studying it for twenty years, and have taught it for ten, yet mastery still eludes me. My perception is that the book demands an awful lot from a reader and certainly that it demands an awful lot from a college sophomore reader.

The book, on the other hand, should be helpful to college professors and high school teachers of biology. Taken in small doses and over a period of time, it can contribute a great deal to shaping the teacher's understanding of evolution. It can stand as a comprehensive ready-reference to which students and teachers alike can turn for help on the scores of

questions which arise whenever evolution is well discussed. The author's balance and poise in treating components of the evolution vs. religion pseudo-controversy can be especially helpful.

For professors and teachers, I recommend it. For students, I'm just not sure. The brightest and the best certainly can handle it and profit from it. It's the rest I'm concerned about. They need a lot of help. For many, Stansfield's *Science of Evolution* may be too much of a good thing.

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### THE SPIRIT OF SYSTEM: LAMARK AND EVOLUTIONARY BIOLOGY

by Richard W. Burkhardt, Jr. 1977. Harvard University Press (79 Garden Street, Cambridge, Massachusetts 02138). 218 p. \$16.50.

This biography of Lamark deals with the years leading to the development of his theory of evolution. Lamark is shown as a product, and perhaps a victim, of French science of the 18th and 19th centuries. A man of many scientific interests, he was more a philosopher than a true scientist. He did not fit the pattern of the scientists of his day and was often at odds with them. Despite this, he willingly absorbed their ideas as his own. Although his relation to both the Lysenko and Kammerer affairs are dealt with briefly, the current concept of Lamark is not the main thrust of this book.

The book is excellently written, well documented, and has an extensive bibliography. It is best suited for college-level students, teachers, or persons with an interest in the historical aspects of evolution.

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### PROCESSES OF ORGANIC EVOLUTION

by G. Ledyard Stebbins. 3rd ed., 1977. Prentice-Hall, Inc. (Englewood Cliffs, New Jersey 07632). 281 p. \$7.50.

This popular book has been one of the most successful in the field of evolution since its first appearance in 1966. The third edition has been extensively revised by expansion of material and considerable reorganization. This edition is by far the best, and readers will find many additional illustrations and examples included in the text. The clear and logical writing makes it an ideal text for a beginning course in evolution or related subjects.

Stebbins liberally includes experiments and illustrations to help the student grasp

the molecular and biochemical aspects of evolution, as well as the more traditional approach emphasizing major groups of organisms and phylogeny.

Evolution is misunderstood by most beginning biology students, and consequently writers of texts dealing with this area should begin with a clear, succinct introduction to the subject. I have never read a better introductory chapter that so clearly introduces the subject than Stebbins' entitled "The Synthetic Theory of Evolution and its Development." This text emphasizes the processes of evolution rather than a phylogenetic approach. The first half of the text deals with evolution at the level of population, race and species. These chapters deal with variation in populations, genetic variability, differentiation of populations, reproductive isolation and origin of species. An entire chapter is given to the importance of hybridization in evolution, which is too often ignored in textbooks on evolution. The

last two chapters deal with major trends in evolution and the processes of evolution in humans.

A considerable number of plant and animal experiments are included, which is refreshing since so many texts include only animal evolution and exclude plants. The author assumes the student using this text will have had some training in biology, particularly Mendelian genetics, in order to understand many of the mechanisms and processes proposed. At the end of each chapter, questions for thought and discussion are given. A list of suggested readings, by chapter, is also included at the end of the book. This is not a bibliography of research articles in journals, but a list of textbooks in the field.

This text could be used by advanced biology students on the high school level, provided they were carefully selected for ability and background.

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EVOLUTION GOES ON EVERY DAY  
by Dorothy Hinshaw Patent. 1977.  
Holiday House, (18 East 56th Street,  
New York 10022). 156 p. \$6.95.

The subject of this book is evolution as an on-going process, not a compilation of evolutionary history. It includes explanation of the Darwinian interpretation of evolution, some of the history of its development, and brief reference to other evolutionary theories. Discussion of the subject ranges from DNA to projections of genetic engineering in humans. Divergence from what is considered to be the prototype for a taxonomic group is used frequently in the text.

This book seems to be intended for the elucidation of evolution for interested persons lacking formal educational background in biology. It might be used as recommended reading for advanced middle school or junior high students with natural science interests or as supplementary reading for secondary biology students.

Although much of the content of this book is knowledgeably presented, interesting, and as contemporary as recent research reports, it is in other respects erroneous and pedestrian. In some instances the author seems to lack the most elementary understanding of her subject, as illustrated by the following excerpt:

If the dwarf grows up, marries a person of normal height and has children, half of them will be dwarfs because each child has a 50 percent chance of inheriting the dwarf gene from its parent.

Some explanations of complex genetic processes indicate the subject has been well researched, but basic processes that are overlooked and left unexplained. Early in the discussion of DNA, RNA is mentioned but only to the effect that it "need not" be discussed in the book. In a later section of the same chapter the author attempts to explain protein synthesis by DNA but without discussing the association of RNA. At times, there seem to be two authors, neither communicating with the other.

The text is illustrated, but the illustrations are definitely amateurish and lacking in quality. An Index, Suggested Reading, and a Glossary supplement the main text, but definitions in the glossary are frequently ambiguous or incorrect; for example: "mitosis: Cell division in which the chromosomes are duplicated exactly, forming two identical 'daughter' cells."

To summarize, some of the areas of this book are well-done, accurate, and interesting. In other areas, the author

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