kind I have seen, and it should be especially useful to teachers.

A list of selected readings is given. My own choice would be somewhat different and would include, for example, some of the Harvard books on astronomy, some beginning college texts, and the *Larousse Encyclopedia of Astronomy*. A few of the definitions in the glossary are fuzzy to the point of being incorrect. A chapter on radio astronomy is needed. The discussion about distances to the distant galaxies could be usefully enlarged, and Allen Hynek falls into a common error when he implies that such distances all depend, in the final analysis, on trigonometric parallaxes. A half dozen other statements need modification: for example, "Nevertheless the moon is man's greatest challenge." There are many greater challenges; for example, man's learning to live in peace with his fellow man.

Although books like this one are needed, the main problem in teaching high school astronomy is in teaching the teachers. Antiquated curriculum requirements make it almost impossible for an ambitious teacher, during summers, to learn astronomy as it should be learned, from an expert university professor. The summer institutes for teachers sponsored by the National Science Foundation are a step in the right direction, but they are woefully inadequate when one considers the number of teachers that need training.

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The Evolutionary Process

The Evolution of Life. F. H. T. Rhodes. Penguin Books, Baltimore, Md., 1962. 302 pp. Illus. Plates. Paper, $1.45.

Introduction to Evolution. Paul Amos Moody. Harper, New York, ed. 2, 1962. xi + 553 pp. Illus. $7.50.

The two books under consideration here approach the science of evolution from different standpoints. Rhodes has written a semipopular description of the history of organisms, with only a brief synthesis and discussion of causes. Moody's book, which is about twice as long (in content), is a college textbook that concentrates more on general features than on the fossil record, although this is presented at adequate length. Neither book requires previous knowledge of biology. Rhodes' book is suitable for general readers; Moody's is more academically written but it is not dry and could be read with profit by any intelligent adult.

Rhodes's account is generally conservative, but it is up to date in most respects. I noticed about a dozen errors of fact and twice that many questionable interpretations, but almost none are at all serious. The coverage is well balanced, considerable attention being given to plants and to post-Paleozoic invertebrates as well as to the usual sequence of Paleozoic invertebrates, a diversion into fish, and a culmination in tetrapods; nevertheless, rodents are scarcely mentioned. Many reconstructions are given; these are quite variable in quality, although most are adequate. The book is vividly and occasionally lyrically written, but it does not convey, as does Moody's (or Beerbower's, or Simpson's, or Dobzhansky's), that evolution is a living science with frontiers that change importantly and constantly. Nevertheless, only the Fentons, in a much more expensive book, have provided laymen with a better introduction to fossils and the history of life.

In this second edition of his well-known book, Moody again gives a clear and competent presentation. It is the most generally adequate and up-to-date treatment, available in English, of the whole of evolution. There are many improvements on the first edition and the results of much recent research are included. Notable among the improvements is a considerable increase in the discussion of evolutionary mechanisms. The number of errors that I noticed is about the same as in Rhodes's book (a small number, considering the scope of the book's subject); the theoretical chapters are somewhat weaker than the factual ones. Every author has his pet subjects, but I was surprised to find 18 pages on serology and only slightly more than one on the origin of life, in which neither colloids, viruses, nor the experimental evidence is mentioned.

Several subjects of considerable importance (as I see it) to the study of evolution are omitted from Moody's book, and from most other books on the subject; these gaps can be filled by the instructor, but they seem worth mentioning. Psychology has not yet contributed significantly to evolutionary theory, but this cannot be said of ecology, from the predecessors of Malthus (who is mentioned) onwards. Ecosystems and the evolution of adaptive zones are ignored, some factors of the control of population size are enumerated and then forgotten, and the fundamental process of general adaptation is omitted.

Embryology has a chapter to itself, and is also discussed elsewhere in the book, but the evolution of patterns and integrated units is not touched on, with the exception of allometric growth. The relations between adaptive plasticity and canalization are not made clear. Thresholds in development and in adaptation are not discussed, and the results of artificial selection, intermediates between races and species, and the significance of sex are also missing. If one were to judge by the treatment given them here, plants stopped evolving in the Permian. But the small size of this list of omissions should be an indication of the relatively complete coverage that Moody gives the evolutionary record and its interpretation.

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Progress Report

Direct Observation of Imperfections in Crystals. Proceedings of a technical conference held in St. Louis, Missouri, in March 1961. J. B. Newkirk and J. H. Wernick, Eds. Interscience (Wiley), New York, 1962. x + 617 pp. Illus. $21.50.

Although the arrangement of atoms in thousands of crystalline substances is known, it has been obvious since about 1934 that there are occasional flaws in these arrangements. In that year Taylor suggested a planar dislocation of the structure to explain "gliding" or "slip" in crystals, and in 1949 Frank suggested a screw dislocation to explain crystal growth; before the end of 1949 screw dislocations were actually observed, and a great impetus was given to the investigation of dislocations generally. In the brief dozen years that have since elapsed, this field of study has renovated our ideas about crystal perfection.

Although several books have already been published on the subject, the aim of this report is to "collect, describe and compare accumulated knowledge about modern methods for observ-

ing crystalline imperfections directly." The methods of direct observation include etching, internal decoration (precipitation of foreign matter in dislocations), diffraction contrast in electron microscopy, x-ray diffraction "topography" (a picture of the crystal taken, for example, along one of its x-ray reflections), and study of irregularities in field ion microscopy. The results of work in all of these fields have recently been reported in the literature.

Those working in the field are presumably familiar with this literature, so the book will probably have its greatest appeal to scientists in related fields. Such readers will be particularly interested in the first three survey chapters, which outline the methods and results obtained by the methods of optical and electron microscopy, x-ray diffraction topography, and field ion microscopy. The main body of the book comprises a series of individual papers that reveal the present state of the art.

It is a curious fact that the study of dislocations has not been carried forward by crystallographers, but by metallurgists and solid-state physcists, who have studied the crystals with which they are most familiar, particularly the metals and alkali halides. Conclusions of general validity probably cannot be made from the study of such trivial patterns of atoms. Apparently little work has been undertaken on dislocations in complex structures. In this book, however, Amelinckx and Delavignette report on dislocations in layer structure, and they include the silicates talc and mica.

This book not only provides a picture of the progress that has been made in the study of dislocations, but it also highlights the fields which have been left uncultivated. For example, what is the status of work on dislocations in crystals with nontrivial structures, such as the feldspars, pyroxenes, and tourmaline. What is the relation of crystal habit—in other than layer structures—to screw dislocations? Is lineage structure related to dislocations? These are obvious directions in which the study of dislocations must be extended.

This book will awaken the crystallographer to these questions. Other scientists will be enlightened if they happen to encounter the book in a library, but they will probably not care to buy it themselves for $21.50.

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Notes

Gerontology

Students of gerontology will find little new information in **Structural Aspects of Ageing** (Geoffrey H. Bourne, Ed. Pitman, London; Hafner, New York, 1962. 419 pp. $20), but they should nevertheless welcome the volume as a useful compendium. Unfortunately, a disturbing number of chapters appear, as the editor's preface candidly states, to have been collected "only for the sake of demonstrating the gaps in our knowledge." The chapters concerned with age-associated changes in joints, blood vessels, cartilage and bone, and teeth and oral tissues should, however, prove to be of particular value, especially to workers in clinical fields. Those workers have too long neglected the significance of findings that are here comprehensively discussed.

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New Books

Biological and Medical Sciences

Advances in Applied Microbiology. vol. 4. Wayne W. Umbreit, Ed. Academic Press, New York, 1962. 261 pp. Illus. $10.

Advances in Pharmacology. vol. 1. Silvio Garattini and Parkhurst A. Shore, Eds. Academic Press, New York, 1962. 485 pp. Illus. $13.

Bacterial Plant Diseases in India. G. Rangaswami. Asia Publishing House, New York, 1962 (order from Taplinger, New York). 175 pp. Illus. $5.

Barley and Malt. Biology, biochemistry, technology. A. H. Cook, Ed. Academic Press, New York, 1962. 754 pp. Illus. $21.

Cells. Their structure and function. E. H. Mercer. Doubleday, Garden City, N.Y., 1962. 145 pp. Illus. Paper, $0.95.

Cucurbits. Botany, cultivation, and utilization. Thomas W. Whitaker and Glen N. Davis. Hill, London; Interscience (Wiley), New York, 1962. 262 pp. Illus. $11.50.

Experiments in Genetics with Drosophila. Monroe W. Strickberger. Wiley, New York, 1962. 153 pp. Illus. Paper, $3.95.

The Exploitation of Natural Animal Populations. A symposium of the British Ecological Society, held at Durham in March 1960. E. D. Le Cren and M. W. Holdgate, Eds. Wiley, New York, 1962. 413 pp. Illus. $10.75.

Neurosecretion. Proceedings of Third International Symposium held in the University of Bristol in September 1961. H. Heller and R. B. Clark, Eds. Academic Press, New York, 1962. 470 pp. Illus. $14.50.

Economics and the Social Sciences

The Cold War, Retrospect and Prospect. Frederick L. Schuman. Louisiana State Univ. Press, Baton Rouge, 1962. 119 pp. $3.50.

Economic Development and Social Change in South India. T. S. Epstein. Univ. of Manchester Press, Manchester, England; Humanities Press, New York, 1962. 369 pp. $8.50.

The Forest People. Colin M. Turnbull. Doubleday, Garden City, N.Y., 1962. 317 pp. Illus. Paper, $1.25.

Great Britain, Geographical Essays. J. B. Mitchell, Ed. Cambridge Univ. Press, New York, 1962. 624 pp. Illus. $7.50.

Marriage in Tribal Societies. Meyer Fortes, Ed. Cambridge Univ. Press, New York, 1962. 164 pp. $4.75.

Mayapan, Yucatan, Mexico. Publ. 619. H. E. D. Pollock, Ralph L. Roys, T. Proskouriakoff, and A. Ledyard Smith. Carnegie Institution of Washington, Washington, D.C., 1962. 447 pp. Plates and maps. Illus. Paper, $9; cloth, $9.50.

The Navaho. Clyde Kluckhohn and Dorothea Leighton. Doubleday, Garden City, N.Y., 1962 (© 1946). 355 pp. Illus. Paper, $1.45.

People and Politics. An analysis of the American political system. Lewis A. Froman, Jr. Prentice-Hall, Englewood Cliffs, N.J., 1962. 124 pp. Paper, $2.25.

Politics of the Kula Ring. An analysis of the findings of Bronislaw Malinowski. J. P. Singh Uberoi. Univ. of Manchester Press, Manchester, England, 1962 (order from Humanities Press, New York). 177 pp. Map. Illus. $5.

Psychoanalysis and Civilization. Paul Rosenfels. Libra, New York, 1962. 222 pp. Illus. $3.95.

A Treatise on Insanity. Ph. Pinel. Translated from the French by D. D. Davis. Hafner, New York, 1962 (facsimile of the London edition, 1806). 393 pp. Paper, $2.75.

Mathematics, Physical Sciences and Engineering

Basic Electrotechnics. B. L. Goodlet. Arnold, London, 1962 (order from St. Martin's Press, New York). 408 pp. Illus. $8.

Concise Physics. For ancillary degree students. R. B. Morrison. Arnold, London, 1962 (order from St. Martin's Press, New York). 571 pp. Illus. $8.

Elastic Analysis of Shells by Electronic Analogy. Charles Bryan Wilby and Norman West Bellamy. Arnold, London, 1962 (order from St. Martin's Press, New York). 64 pp. Illus. $6.50.

Electromagnetics and Fluid Dynamics of Gaseous Plasma. Proceedings of a symposium held in April 1961. Jerome Fox, Ed. Polytechnic Institute of Brooklyn Press and Interscience (Wiley), New York, 1962. 492 pp. Illus. $8.

Elementary Real Analysis. H. G. Eggleston. Cambridge Univ. Press, New York, 1962. 289 pp. Illus. $6.50.

Gas-Liquid Chromatography. Theory and practice. Stephen Dal Nogare and Richard S. Juvet, Jr. Interscience (Wiley), New York, 1962. 468 pp. Illus. $13.95.