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-