

that they, after once having put forth an erroneous explanation, are far less likely than their pupils to alter a hypothesis in the face of contrary experimental evidence! This finding alone, if valid with a larger selection of teachers, has a multitude of implications as to the fate of the scientific attitude in the process of developing a pedagogical attitude.

Mr. Oakes lists questions and simple science experiments presented in his study, together with a classification of some basic science concepts as to difficulty. There is also a convenient tabulation of types of answers given to his questions. The book is of especial value to those interested in the problems of elementary school science, but we all can benefit from a review of the development of the thought patterns basic to scientific work.

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SMITH, ELLA THEA. *Exploring Biology*. 3rd ed. Harcourt, Brace and Company, New York. viii + 607 pp. illus. 1949. \$3.98.

The reviewer has had the opportunity to see *Exploring Biology* grow up. One is tempted to explore, upon first opening the book, by a reproduction of one of nature's grandest scenes found inside its covers. The new third edition retains the unit-problem approach. From the outset the author challenges the student to the realization that Biology is a practical subject in a changing world. A statement of pertinent recent advances introduces each unit. Important words are italicized and marked for ease of pronunciation. There are 364 well chosen illustrations. The phlogenetic "trees" are especially valuable in aiding the student to see relationships in plants and animals. At the end of each problem a section is devoted to the Biology notebook, which includes directions for laboratory work; a vocabulary of significant words pertaining to the unit; a list of thought questions; and references for suggested readings. A supplementary manual is unnecessary. The book is appended by a "classroom library" which lists numerous titles of magazines,

government publications, pamphlets, and books suitable for supplementary reading. A paragraph devoted to the listing of biological literature—great literary masterpieces—enhance the aesthetic value of the book. The book is the most accurate and the least teliological that the writer has been privileged to examine in recent years. The author has the unusual ability to simplify biological information without sacrificing accuracy. Whether algae and fungi are classes; whether the peony is a plant organ; or whether all desert plants are xerophytes—these and more fundamental problems will surely be solved by enterprising students as they explore the realm of Bios.

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KNIGHT, R. L., *Dictionary of Genetics: Including Terms used in Cytology, Animal Breeding and Evolution*. Chronica Botanica Co., Waltham, Mass.; Stechert-Hafner, Inc., New York City. ix + 183 pp. 1948. \$4.50.

This book is the first attempt to bring together in the English language a comprehensive list of terms used in genetics, cytology, animal breeding, and evolution. The nearest approach to it heretofore has been in glossaries in one or the other of the special fields, best exemplified in Wilson's classical book on *The Cell in Development and Heredity*. The present work has drawn upon the leading American and British sources, including numerous books and journals. The author is Senior Economic Geneticist, Empire Cotton Growing Corporation and Sudan Government. It should prove valuable to the reader who is not an expert in any of the branches of biology it covers. The author hopes that it will help to discourage biologists from further unnecessarily increasing terminology, particularly from coining new words where suitable terms already exist. Biology suffers more from such excess verbiage than most branches of science.

The definitions are clear and concise; pronunciations and derivations are not given. Twelve pages of appendices are a valuable feature of the book. These include numer-

ous useful statistical formulae and tables, including a table on the distribution of chi square; a list of International Rules for Symbolizing Genes and Chromosome Aberrations; and a table of Distances Recommended to Avoid Seed Contamination. The book is attractively made up and is printed in clear type on a heavy grade of paper. It should be on the shelves of every high school, junior college, and college library wherever a serious course in biology is given; for it covers a broad field in which in recent decades some of the most interesting and significant discoveries in the whole science of biology have been made. The teacher of biology or of any of its branches will want a copy on his desk.

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TANNER, FRED WILBUR, TANNER, FRED WILBUR, JR. *Bacteriology—A Textbook of Microorganisms.* Fourth ed. John Wiley and Sons., New York. 625 pp. 137 illus. 1948. \$4.50.

This text surveys the field of microorganisms, including molds, yeasts, viruses, and protozoa, with major emphasis on bacteria. Equal stress is placed on the pathogenic and non-pathogenic forms. An excellent historical background is presented with further chapters covering the more important recent developments and theories in the field. Thirty one chapters and topical subjects cover such material as: history and early development; relationship and general principles of plants and animals; ultra-microscopic forms of life; morphology of bacteria; nomenclature and classifications; related microorganisms; physical and chemical agents; growth and nutrition; bacterial cycles; industrial and food bacteria; sanitation; disease, transmission and infection, bacterial actions; immunities; and plant diseases.

The authors use other sources frequently and give these sources at the bottom of each page. Supplementing each chapter is a selected list of references. Subheadings are used for main topics and important points are italicized. The book contains a classification and key for the identification of organ-

ism of the Class Schizomycetes from Bergey, a classification of yeasts, and a chart for forty common communicable diseases with etiologic agents, source of infection, mode of transmission, incubation period, immunity and control. Of the many illustrations used, about half are drawings and the other half are photopographs; many of the photographs have been poorly reproduced. A striking feature is the appendix which lists the more important publications of bacteriological literature including text books, abstracts, and journals and periodicals. A brief glossary is included plus a complete fifteen page index.

The material concerning ultramicroscopic speculations and relationships of plants and animals is well summarized and written to produce further thought. The presentations of actual disease case histories adds color to the content. By the material being presented in a stimulating manner and the minimization of technical terminology, the authors have given to beginning students of bacteriology an excellent study book that lacks the "coldness" of many text books.

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HAUPT, ARTHUR W. *Laboratory Manual of Elementary Botany.* 2nd ed. McGraw-Hill Book Company, Inc., New York. x + 79 pp. No. illus. 1946. \$1.25.

This elementary botany laboratory manual for college use is a revision, with some minor changes and additions, of the author's 1939 edition. Its 116 more or less independent exercises complete a full year's course; with the exception of a few, each exercise could probably be completed in a laboratory period of two hours. A listing of needed supplies appears in the introduction, together with directions for making drawings and observational notes. These directions are sufficiently general for adaptability to a department's individual routine. Concise and complete directions are given for the care and use of a microscope; however, but one practice exercise is outlined. More practice exercises might well be included to prepare students for the rather detailed microscope work which follows.