

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.

Most of the exercises call for readily obtainable materials and relatively simple and inexpensive apparatus.

The vocabulary seems at times unnecessarily technical for beginners; however, most of the scientific terms and label names are emphasized in the text matter. Very little descriptive material is included, and no illustrations. Some thought-provoking questions are proposed, but no problems are included which involve practice in scientific thinking or which might provoke animated class discussion. For a laboratory outline of the older, more conservative, and formalized type, this manual is well written and carefully organized. Although adaptable for general use, it could be used perhaps most effectively with the author's textbook, *An Introduction to Botany*.

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GUILLIERMOND, ALEXANDRE, AND ATKINSON, LENETTE R. *The Cytoplasm of the Plant Cell*. Second printing. Chronica Botanica Company, Waltham, Mass., & Stechert-Hafner, Inc., New York. x + 246 pp. illus. 1941. \$5.00.

A thorough though condensed presentation of the present knowledge relative to the cytoplasm of the plant cell. The true nature of the chondriosomes and of other parts of the cytoplasm are discussed by Professor Guilliermond in a most complete and authoritative manner. Though the manuscript was written toward the end of Guilliermond's active career it shows throughout the book a keen awareness of the importance of the recent advances in cytology. This exhaustive treatise on the highly complex nature of cytoplasm was written by an expert who knew how to impart his knowledge in relatively simple language. Mrs. Atkinson translated the manuscript from the French into most understandable English, and has further contributed to the excellence of the book by her arrangement of the subject matter. Though this book contains little that is of direct application in the high school classroom, it is invaluable to teachers who wish to secure the knowledge and back-

ground which are vital to a dynamic teacher of biology.

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GRANT, CHARLOTTE L., CADY, H. KEITH, AND NEAL, NATHAN A. *American High School Biology*, Harper and Brothers Publishers, New York. xiii + 888 pp. illus. 1948.

This book can be recommended as a readable, up-to-date and useful high school biology textbook. The authors have approached the study of the basic principles of biology by relating them adequately to the student's own experiences. They have made a judicious selection of material from the vast array of biological information and presented this in terms that can be understood and appreciated by students at the high school level.

The method employed in presenting the student with the organization of living things into groups without resorting to the usual long and technical description of phyla and divisions should be a useful approach for students at the high school level. There are several chapters including new and pertinent information not always found in high school biology texts. These include: "Organic Diseases Today," "Body Defenses and Drug Allies," "Plants and Animals in Drugs and Medicines," and "Occupations in Biology." The emphasis on conservatism in many places throughout the book is a progressive feature.

Some of the chapter titles may be misleading if not properly interpreted by the student or teacher. For example, the chapter on "Food Comes From the Soil," while giving an interesting account of the nature and importance of the soil, does not relate the equally important factors of energy from light, and CO<sub>2</sub> from the atmosphere to the source of food. It is true that these relationships are brought out in a later chapter. However, if the student has already formed the concept that food comes from the soil, it may be difficult to reorient his thinking to include these other factors of fundamental importance. Another chapter title, "Stems and Roots Store Food," is one which seems poorly adapted to the content of the chapter.