

he calls the Jeffersonian and Jacksonian viewpoints. When he comes to "Higher learning," however, he shows himself painfully aware of the difficulties of reconciliation. He is convinced that American public opinion will never stand for a system designed to educate an "intellectual elite." But he asks the pertinent question whether "full-time further education" (that is, education beyond the high school) and "university education" are necessarily one and the same process. This old question of quantity versus quality is the unsolved problem of American education. How can we provide equality of educational opportunity without sacrificing the leaven that leaveneth the lump? With all his tact and imagination, Richmond's treatment of this problem is forthright enough to make his book worth while for Americans as well as for his own countrymen, for whom it was primarily intended.

A small point perhaps, but as a proof-reading job the book is no credit to British publishing.

F. L. WORMALD

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Advances in Genetics. vol. VIII. M. Demerec, Ed. Academic Press, New York, 1956. 402 pp. Illus. \$9.

This latest volume in a well-known series contains eight articles by ten authors and deals with the usual diversity of topics: mutations in plants; population genetics of *Gilia*; chromosome re-patterning and adaptation; genetics of flax, bees, ladybeetles, and sheep; and the cytogenetics of the tomato.

As in previous volumes, the articles, with few exceptions, deal with the total or general genetics of specific kinds of organisms. This arrangement is both an advantage and a disadvantage. It is an advantage to the investigator who wishes to find all the facts he can about the genetics of bees, beetles, barley, and toads, and to the teacher who is searching for apt examples of genetic phenomena beyond the often quoted textbook cases. It is a disadvantage to the student of heredity who is looking for competent reviews of the scientific issues of current interest in genetics. He will have to seek elsewhere.

The greatest single shortcoming of the eight volumes appears to be in the use of "advances" in the title. While genetics does advance by the accumulation of facts and the naming of genes, these advances must always be secondary to the improvements in concepts and interpretations based on the facts. If a person, not familiar with the nature of these volumes, were to come upon the title in a library file, search out the volumes, and examine the contents, he might go away

with the impression that genetics advances only by discovering new facts and miss the idea that genetics advances by exploring issues.

EARL L. GREEN

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Principles of Fungicidal Action. vol. 30 of *New Series of Plant Science Books*. James Horsfall. Chronica Botanica, Waltham, Mass.; Hafner, New York, 1956. 279 pp. Illus. \$6.50.

The study which relates man's fight against fungi and mildew, like all divisions of science, has advanced very rapidly in the last decade. This book, compiled at the rate of a chapter a week while the author was on sabbatical leave at the University of California during 1955, serves to bring the academic and applied microbiological devotee up to date on our present knowledge of mechanisms of fungitoxicity. Of the 678 references in the bibliography, 52 percent have been published since 1945, the date of James Horsfall's first publication on this subject. The treatise differs from the run-of-the-mill scientific compilations, since, as is pointed out by the author, the researches of his friends served as the source of light; Horsfall "merely produced the design for the shadow." This shadow of the compiler is cast throughout each chapter by the folksy way in which a very involved mechanism of action may be described, by the idiomatic expressions which are interspersed, and by the author's metaphorical description of fungus cells and components.

If your interests center around the composition of a fungus symphony and the effects which may be wrought upon this orchestra merely by a squeaky metabolic clarinet, these chapters are recommended for your further attention. A bonus, consisting of the author's opinions, questions, and suggestions for further research, is to be found in almost every chapter. Because of the manner in which the technical aspects of this microbiological field are presented, and because the reading of this volume accentuates the presence of gaps in our knowledge of this field, *Principles of Fungicidal Action* should prove of interest and value to those allied with this specialty as well as to academicians in both university and industrial life.

In the opening pages of this book, Horsfall acquaints the reader with landmarks in the history and development of fungicides. Appropriate definitions and necessary background information are found in the following two chapters, which are concerned with the appraising and the measuring of fungicidal and protective action of chemicals. The

various theories which attempt to answer such questions as how a chemical becomes available to the fungus and how it is mobilized so that its toxicity may be exerted are next discussed. The author hazards the guess that 75 percent of the reactions operative in fungitoxic mechanisms occur inside the cell; therefore, the important principle of fungicidal action—namely, permeation and penetration—is treated separately, in chapter 5.

The remaining ten chapters of the book contain discussions of the disruptive disturbances imposed by chemicals upon the fungus cell. These are divided, generally, into physical and chemical interferences. Under physical influences caused by various fungicides are included effects upon cellular structures, mitosis, spindle formation, chromosomal division, and conidial production. Chemical disruptions attributable to fungicides include such effects as those on enzymes, respiration, pigmentation, metabolites, and dormancy. In an entire chapter, importance of mineral nutrition to the well-being of the fungus is discussed in relation to the importance of chelation as a possible mechanism of fungitoxicity.

Discussions, in five chapters, contain background information in which the organic chemist, faculty adviser, or research director may find the appropriate clue to synthesize, or have synthesized, the best fungicide. These chapters are entitled: "Action of metals," "Action of sulfur," "Action of organic sulfur compounds," "Action of quinones and other ketones," and "Action of heterocyclic compounds."

The author's enthusiasm for the new frontier in plant pathology—namely, chemotherapy—is evidenced by his introduction to this subject in the last chapter of the book.

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Principles of Guided Missile Design. *Aerodynamics, Propulsion, Structures and Design Practice*. E. Arthur Bonney, Maurice J. Zucrow, and Carl W. Besserer. Van Nostrand, Princeton, N. J., 1956. 595 pp. Illus. \$10.

This book is aimed at those individuals who may be interested in, or are at present directly working in, the guided-missile field. The organization of each section is of such a nature that the material presented can be readily understood by those who may themselves be untrained specialists. As a consequence of this objective, each section contains a large amount of general information in addition to the presentation of the fun-