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 proofreading job the book is no credit to British publishing.

F. L. WORMALD
Association of American Colleges

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 repatterning 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
Roscoe B. Jackson Memorial Laboratory

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.

HAROLD G. SHIRK
National Academy of Sciences–National Research Council

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-

damental principles usually associated with each subject.

E. A. Bonney, in writing the "Aerodynamics" section, limits himself to discussion of the supersonic speed range. This limitation is based on his assumption that, in the guided-missile field, the supersonic speed range is the only one of practical importance. Encompassing such topics as atmospheric conditions, shock and expansion waves, missile configurations, and static and dynamic stability, this particular section is of a nonmathematical nature.

"Propulsion," by M. J. Zucrow, is directed toward the establishment of the fundamental principles governing the internal-flow characteristics of power plants employed in guided missiles. Discussing such topics as the gas-dynamic equations, nozzles, diffusers, and various classes of engines, this section does at times have an overabundance of mathematical equations. However, no sacrifice has been made in the explanation of important concepts.

Design problems resulting from flight loads, environmental conditions, and reliability requirements are discussed in "Structures and design practice," by C. W. Besserer. Chapters outlining the principles of packaging engineering and component and composite design are also included. The title of this particular section is somewhat misleading in that the word *structures* is not employed in its more usual sense but is meant to imply "structural materials."

All three sections are accompanied by extensive references for those who wish to make further investigation of any subject.

In short, this is a well-written and easily read book—a definite necessity for those engaged in guided-missile design.

ROBERT DUFFY
Rensselaer Polytechnic Institute

New Books

Tranquilizing Drugs. A symposium held under the auspices of the American Association for the Advancement of Science in cooperation with the American Psychiatric Association and the American Physiological Society at the AAAS Atlanta, Ga., meeting, 27–28 Dec. 1955. Publ. No. 46. Harold E. Himwich, Ed. American Association for the Advancement of Science, Washington, D.C., 1957. 197 pp. $5; $4.50, AAAS members.

The Modern Universe. Raymond A. Lyttleton. Harper, New York, 1957. 207 pp. $3.

Geologie Sedimentaire. Les series marines. Augustin Lombard. Masson, Paris; Vaillant-Carmanne, Liege, 1956. 722 pp. F. 11,000.

Nature's Guardians, Your Career in Conservation. Messner, New York, 1957. 192. pp. $3.50.

Human Factors in Air Transportation. Occupational health and safety. Ross A. McFarland. McGraw-Hill, New York, 1953. 830 pp.

When Doctors Meet Reporters. A frank discussion by science writers and physicians of the controversy between the press and the medical profession. Compiled by Hillier Krieghbaum, from the record of a series of conferences sponsored by the Josiah Macy, Jr., Foundation. Published for the foundation by New York University Press, New York, 1957. 119 pp. $2.50.

Optics. The science of vision. Vasco Ronchi. Translated from the Italian and revised by Edward Rosen. New York University Press, New York, 1957. 360 pp. $10.

Practical Applications of Engineering Soil Maps. Engineering Soil Survey of New Jersey, Rept. No. 22. William W. Holman, Robert K. McCormack, James P. Minard, Alfred R. Jumikis. Rutgers University, New Brunswick, N.J., 1957. 113 pp. $3.

Cold Injury. Transactions of the fourth conference 7–9 Nov. 1955, Princeton, N.J. M. Irene Ferrer, Ed. Josiah Macy, Jr., Foundation, New York, 1956. 371 pp. $5.95.

Investigation of Virus Diseases of Brassica Crops. Agricultural Research Council Rept. Ser. No. 14. L. Broadbent. Cambridge University Press, New York, 1957. 94 pp. $3.

John Muir, Father of Our National Parks. Charles Norman. Messner, New York, 191 pp. $2.95.

Coal Science. Aspects of coal constitution. D. W. Van Krevelen and J. Schuyer. Elsevier, New York, 1957 (order from Van Nostrand, Princeton, N.J.), 352 pp. $9.50.

Meat Hygiene. WHO Monograph Ser. No. 33. World Health Organization, Geneva, 1957 (order from Columbia University Press, New York). 511 pp. $10.

Gestation. Transactions of the third conference 6–8 Mar. 1956, Princeton, N.J. Claude A. Villee, Ed. Josiah Macy, Jr., Foundation, New York, 1957. 253 pp. $4.75.

A Naturalist in Palestine. Victor Howells. Philosophical Library, New York, 1957. 180 pp. $6.

Butterflies. E. B. Ford. Collins, London, ed. 3, 1957 (order from Macmillan, New York). 368 pp. $6.

The Population of Jamaica. George W. Roberts. Published for the Conservation Foundation at Cambridge University Press, New York, 1957. 356 pp. $7.50.

The Physiology of Reproduction in Fungi. Cambridge Monographs in Experimental Biology No. 6. Lilian E. Hawker. Cambridge University Press, New York, 1957. 128 pp. $3.

Treatise on Invertebrate Paleontology. pt. L. *Mollusca 4, Cephalopoda, Ammonoidea.* Raymond C. Moore, Ed. Geological Society of America and University of Kansas Press, 1957 (order from the Geological Society of America, 419 W. 117 St., New York 27). 490 pp.

The Defect Solid State. T. J. Gray, D. P. Detwiler, D. E. Rase, W. G. Lawrence, R. R. West, T. J. Jennings. Interscience, New York, 1957. 511 pp. $11.

The Electrical Production of Music. Alan Douglas. Philosophical Library, New York, 1957. 223 pp. $12.

Television Engineering, Principles and Practice. vol. 3. *Waveform Generation.* BBC Engineering Training Manuals. S. W. Amos and D. C. Birkinshaw. Iliffe, London; Philosophical Library, New York, 1957. 226 pp. $15.

Television Receiving Equipment. W. T. Cocking. Iliffe, London; Philosophical Library, New York, ed. 4, 1957. 454 pp. $15.

Modern Chemistry for the Engineer and Scientist. G. Ross Robertson. McGraw-Hill, New York, 1957. 442 pp. $9.50.

Automation: Its Purpose and Future. Magnus Pyke. Philosophical Library, New York, 1957. 191 pp. $10.

Emotional Illness: How Families Can Help. Karl R. Beutner and Nathan G. Hale, Jr. Putnam, New York, 1957. 158 pp. $2.75.

The Water Relations of Terrestrial Arthropods. Cambridge Monographs in Experimental Biology No. 5. E. B. Edney. Cambridge University Press, New York, 1957. 109 pp. $3.

Fleas, Flukes and Cuckoos. A study of bird parasites. Miriam Rothschild and Theresa Clay. Macmillan, New York, 1957. 305 pp. $5.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, *but to the publisher or agency sponsoring the publication.)*

Atomic Energy Commission, Twenty-first Semiannual Report. U.S. Atomic Energy Commission, Washington, 1957. (order from Supt. of Documents, GPO, Washington 25). 396 pp.

Research in Industrial Education, Summaries of Studies 1930–1955. Vocational Division Bull. No. 264. Trade and Industrial Series No. 65. U.S. Department of Health, Education, and Welfare, Office of Education, Washington, 1957 (order from Supt. of Documents, GPO, Washington 25). 527 pp. $1.75.

Cephalochordata. John Murray Expedition 1933–34. Scientific Reports, vol. X, No. 3, 8 pp. 6s.; *Variation in the Wester Zosteropidae (Aves).* Bulletin of the British Museum (Natural History), Zoology, vol. 4, No. 7. R. E. Moreau. 135 pp. 35s.; *Studies on the Structure and Taxonomy of Bulinus jousseaumei (Dautzenberg).* Bulletin of the British Museum (Natural History), Zoology, vol. 5, No. 1. C. A. Wright. 29 pp. 10s. British Museum (Natural History) London, 1957.

Virus and Viruslike Diseases of Stone Fruits in Utah. A handbook for their identification and control. Bull. 384. B. L. Richards and L. C. Cochran. Utah Agricultural Experiment Station, Division of Agricultural Sciences and Utah Agricultural Experiment Station, Salt Lake City, 1957. 130 pp. $1.50.

The Student's Role in College Policy-Making. A report prepared by Harry H. Lunn, Jr., for the Commission on Student Personnel of the American Council on Education. American Council on Education, Washington, 1957. 100 pp. $1.