was due in part to his erroneous supposition that there had been no progress in mathematical or experimental physics since Aristotle and Archimedes; to this Thorndike remarks that "most modern physicists do not repeat Galileo's mistake of studying only ancient science and neglecting medieval activity in physics, for the simple reason that they do not pay any attention to the history of science. But is this not doubling his error?" (vol. 7, pages 43–44).

This is a question for the conscience of the physicist, but he can hardly be expected to do anything about it without the aid of those trained in the exploration of the dark continent of obsolete science. Thorndike has done far more than his share in mapping this region.

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Solid State Physics. vol. 6, *Advances in Research and Application.* Frederick Seitz and David Turnbull, Eds. Academic Press, New York, 1958. xiv + 429 pp. $12.

As the successive volumes in this series come out, at a rate of something like two a year, and as one scans the list of articles planned for future volumes, one cannot help but be impressed by the diversity of the subjects which come under the general classification of solid-state physics. And so it is with the volume under review, the sixth of the series, which contains the following articles: "Compression of solids by strong shock waves," by M. H. Rice, R. G. McQueen, and J. M. Walsh; "Changes of state of simple solid and liquid metals," by G. Borelius; "Electroluminescence," by W. W. Piper and F. E. Williams; "Macroscopic symmetry and properties of crystals," by Charles S. Smith; "Secondary electron emission," by A. J. Dekker; "Optical properties of metals," by M. Parker Givens; and "Theory of the optical properties of imperfections in nonmetals," by D. L. Dexter.

During World War II scientists were interested in the propagation of shock waves through various media, primarily from the armaments standpoint, and a general theory of this process was worked out by Bethe for media satisfying a wide range of possible equations of state. The realization that the experimental data could be inverted to yield information about the equation of state of solids has opened up an interesting field for research, and the very welcome article by Rice *et al.* summarizes the progress in this field to date. These authors present the hydrodynamical and thermodynamic equations basic to a discussion of shock-wave propagation in solids, together with a description of experimental methods and a comparison of the results of experiments and theoretical calculations.

The article by Borelius is less a survey article than the others in this volume and is concerned primarily with an exposition of his recent work on changes of state (particularly melting) which occur at zero pressure. The theory is essentially phenomenological, and with a proper choice of parameters in his equations Borelius is able to obtain good agreement with experimental values for the changes in energy, entropy, and volume on melting.

Electroluminescence is the excitation of light emission in phosphors as a result of an applied potential difference across the phosphor. In their article, the longest in this volume, Piper and Williams are concerned primarily with the basic mechanisms of electroluminescence and with the effect of local field conditions in determining the operative mechanism in any particular case. This exhaustive article, with over 200 references to the literature, should become an essential part of the library of any physicist conducting research in this field.

Although there exist several books and review articles dealing with the effect of the symmetry of a crystal on the components of the tensors describing the physical properties of the crystal, Smith's article serves as an excellent introduction to this subject. Since most introductory discussions of crystallography are usually limited to formal explanations of symmetry operations and point groups and to definitions of concepts such as space groups, the present article, which goes beyond this, with its emphasis on the relation between crystalline symmetry and macroscopic crystalline properties, is very welcome.

The stated purpose of the review by Dekker is to present and discuss experimental information that seems pertinent to an understanding of the secondary emission process. This the article does, but in addition it contains a careful discussion of several theories of this process, comparing their predictions with the experimental results.

The last two articles deal with the optical properties of metals and of imperfections in nonmetals, respectively. The article by Givens is divided almost equally between a theoretical discussion of the index of refraction and of the absorption coefficient of metals and a description of experimental techniques for their determination, together with a summary of the experimental data for a large number of metals. The theoretical treatment is essentially classical, except for the discussions of the internal photoelectric effect and the anomalous skin effect. Dexter's article, on the other hand, is concerned exclusively with the theory of those optical properties of nonmetals which are explicitly connected with the presence of imperfections. It is primarily a description of the various techniques which have been developed over the years for investigations of this problem, together with a summary of the results obtained. Some discussion of the relation of experimental results to theoretical predictions is given, but the emphasis is principally on the theoretical aspects of the problem.

All of the articles in this volume are written by people well known for their contributions to their respective fields. They are well written and are certainly up to the high standards set by the preceding volumes in this series, to which the present volume makes a fit addition.

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Genetics. A survey of the principles of heredity. A. M. Winchester. Houghton Mifflin, Boston, Mass., ed. 2, 1958. xiii + 414 pp. Illus. $6.25.

This is an anthropomorphically oriented elementary textbook of genetics that is evidently written for the college student who has had little previous formal education. A veritable picture book, it presents genetics primarily as a social science in the best merchandizing tradition of the elementary-textbook trade. It is impossible to recommend this text for use as supplementary material for any serious beginner's course in genetics.

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Land, the Yearbook of Agriculture, 1958. U.S. Department of Agriculture, Washington, D.C., 1958 (order from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.). xi + 605 pp. Illus. + plates. $2.25.

The first volume in this series was published by the Commissioner of Patents in 1849. Since 1936 each volume has been devoted to a special subject important to American agriculture. The present volume returns to the most fundamental problem of agriculture—the land—and discusses the physical, legal, and economic characteristics of land and the past, present, and probable future utilization of this resource.

In 67 chapters, which include numerous attractive pictures and many instructive charts and maps, 93 eminent authorities from inside and outside the Department of Agriculture tell how our domain has been acquired and put to

use, how public and private lands are managed in the various parts of our country and in our territories and island possessions, and how the productivity of our land resources has been increased through better understanding of soil characteristics and of the use of farm machinery, fertilizers, agricultural chemicals, irrigation and drainage, and improved varieties of crops and animals.

Major attention is given to the economic and legal aspects of land tenure, types of ownership, land value and appraisal, credit, insurance, taxes, the real-estate market, and the transfer of property rights. After a section on present income from farm land, the protection of future productivity by proper soil and water conservation is treated, with all the emphasis which this subject requires in view of our growing need for food and fiber for a rapidly expanding population. To achieve such protection a proper balance must be struck between present and future requirements; between crop and animal production; between farm land, pasture, and forest; between adequate incomes for the farmers and the requirements of future generations.

While the *Yearbook* does not offer any specific program or plead for any particular form of land policy except that of sound conservation of resources, it raises questions that should be the concern of every citizen.

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The Medical World of the Eighteenth Century. Lester S. King. University of Chicago Press, Chicago, 1958. xix + 346 pp. $5.75.

In a series of interconnected essays on apothecary and physician, on quack and empiric, on Boerhaave, fevers, homeopathy, nosology, ethics, pathology, and practice, Lester S. King, clinical professor of pathology at the University of Illinois College of Medicine, delineates in an attractive manner the "medical world of the 18th century," interpreting it as the era of the foundation of modern medicine. Without attempting to present a comprehensive history of the period, he describes clinical medicine and pathology in their main outlines and, with reference primarily to England, the classes of practitioners and their multitudinous conflicts, paying particular attention to the ethical and economic implications.

The book, interspersed with salient observations on the philosophy of science and the scientific method, may be read with profit and pleasure by physicians and laymen alike. It is written in a pleasant style and except for a dozen or so proof-reading slips (the most serious being a wrong line of poetry on page 16), it is a commendably good example of the printer's craft.

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Textbook of Virology for Students and Practitioners of Medicine. A. J. Rhodes and C. E. Van Rooyen. Williams and Wilkins, Baltimore, ed. 3, 1958. xv + 642 pp. Illus. $10.

The third edition of this well-known textbook follows the same general pattern as the second edition, published five years ago, although there has been a moderate (15 percent) increase in size. The first section is devoted to a general discussion of viral agents and of the characteristic infections which they produce in man and animals. The next two sections take up individual diseases in groups, according to the systems primarily involved (skin diseases, respiratory diseases, neurotropic virus diseases, and so forth), or, when this is not possible, according to epidemiological or etiological considerations (arthropod-borne and tropical fevers, diseases caused by the Coxsackie viruses). The final section is devoted to rickettsial infections.

As stated by the authors, "this text is written primarily to help medical students and practitioners to a better understanding of the etiology, natural history, and epidemiology of the individual viral diseases of man." They have succeeded admirably in this purpose within the limitations of space set by an introductory textbook. A wealth of up-to-date information is presented in a clear and succinct fashion (as, for example) in the chapter on poliomyelitis). Although space requirements have limited the discussion of controversial matters, dogmatic statements have been avoided. The bibliography, consisting almost entirely of articles published in English, is extensive and up to date. The illustrations are excellent, and very few typographical errors have crept into the text. A combined author and subject index adds to the value of the book. One regrets that the authors were not in a position to expand their chapter on "Present concepts of the nature of viruses," and that the final section devoted to rickettsiology, the traditional stepchild of virology, is so brief.

This is an excellent textbook which can be recommended highly to medical students and physicians as one of the outstanding introductions to viral infections of man.

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New Books

Algae. The grass of many waters. Lewis Hanford Tiffany. Thomas, Springfield, Ill., ed. 2, 1958. 214 pp. $6.50.

Aviation Medicine, Selected Reviews. Clayton S. White, W. Randolph Lovelace II, and Frederic G. Hirsch. Pergamon, New York and London, 1958. 310 pp. $12.

Biology. A course of selected reading by authorities. International University Society, London, ed. 2, 1958 (order from Collings, Inc., New York 17). 381 pp. $4.50. This volume of selected readings is divided into units on the unity of life, the diversity of life, biology and health. There is an introductory reading guide by Sir S. Zuckerman. Contributors include T. H. Huxley, J. D. Bernal, C. H. Waddington, S. Zuckerman, and Julian Huxley.

Disease, Life, and Man. Selected essays by Rudolf Virchow. Translated with an introduction by Lelland J. Rather. Stanford Univ. Press, Stanford, Calif., 1958. 281 pp. $5.

Epoxy Resins. Irving Skeist. Reinhold, New York, 1958. 305 pp. $5.50.

Food Microbiology. William Carroll Frazier. McGraw-Hill, New York, 1958. 481 pp. $9.

Free Radicals as Studied by Electron Spin Resonance. D. J. E. Ingram. Academic Press, New York; Butterworths, London, 1958. 283 pp. $9.50.

Geology of the Great Lakes. Jack L. Hough. Univ. of Illinois Press, Urbana, 1958. 331 pp. $8.50.

The Green Flash and Other Low Sun Phenomena. D. J. M. O'Connell. North-Holland, Amsterdam; Interscience, New York, 1958. 192 pp. $6.

A Guide to the History of Bacteriology. Thomas H. Grainger, Jr. Ronald, New York, 1958. 221 pp. $4.50. This guide, with selected references, was compiled for use in a history of microbiology course offered at Lehigh University. It is divided into a selective guide to the literature of bacteriology (general references and references on bacteriology); a history of bacteriology, with special reference to specific areas; biographical references and bacteriologists; and a selected guide to biographies of selected bacteriologists.

Gum Plastics. M. Stafford Thompson. Reinhold, New York, 1958. 203 pp. $4.50.

Inside the Great Mirror. A critical examination of the philosophy of Russell, Wittgenstein, and their followers. James K. Feibleman. Nijhoff, The Hague, Netherlands, 1958. 228 pp.

The Integration of Human Knowledge. A study of the formal foundations and the social implications of unified science. Oliver L. Reiser. Sargent, Boston, Mass., 1958. 492 pp. $8.

Junction Transistor Electronics. Richard B. Hurley. Wiley, New York; Chapman & Hall, London, 1958. 490 pp. $12.50.

Patients, Physicians, and Illness. Sourcebook in behavioral science and medicine. E. Gartly Jaco. Free Press, Glencoe, Ill., 1958. 608 pp. $7.50.

Patterns of Discovery. An inquiry into the conceptual foundations of science. Norwood Russell Hanson. Cambridge Univ. Press, New York, 1958. 250 pp. $5.50.