

excluded by the conceptual framework presupposed. All others will be attracted to the opening paper, "The basic concepts of algebraic logic" (reprinted from the *American Mathematical Monthly*), in which the author's facility for mathematical exposition is well illustrated. Only those who have worked with Boolean algebras are likely to penetrate beyond this essay, and none but serious logicians can be expected to work through the entire volume. They will be rewarded by a thorough algebraic account of classical predicate logic and by a consideration of the difficulties inherent in algebraizing that part of logic, such as Gödel's incompleteness theory, which rests on the notion of recursive functions. Largely untouched are higher-order logic, intuitionistic logic, and various extensions of classical logic, such as extensions to systems with infinitely long formulas, which arise naturally in the algebraic context.

Clearly workers in the area covered will be greatly convenienceed by this collection, which is reprinted from eight journals published in four countries. Of course one may wonder why the author chose to scatter such closely connected papers originally. Beyond the case at hand, one is also led to speculate about the desirability of replacing general mathematical journals by more specialized ones.

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Theory and Interpretation

Advanced Inorganic Chemistry. F. Albert Cotton and G. Wilkinson. Interscience (Wiley), New York, 1962. xv + 959 pp. Illus. \$14.50.

This text is an attempt to incorporate into descriptive inorganic chemistry the modern physical and theoretical foundations upon which chemical and physical behavior are based. Along with this ambitious design, the authors include brief treatments of most of the material currently found in all other inorganic texts on the market, all the way down to such items as the commercial discovery of familiar elements from nature. Only those who have studied chemistry can comprehend the book but, in many places,

the authors seem to forget that the book's readers will have some chemical education. Perhaps the most striking illustration of this is the first sentence of part 1, chapter 1, section 1-1: "Every atom consists of a nucleus surrounded by electrons." The reader is then given definitions of atomic mass units, nucleons, mass number, atomic number, isotopes and the like, and before a dozen pages have been turned, he sees the wave equation for the hydrogen atom and a table of its solutions.

After the usual treatment of atomic structure and ionic crystals, covalent bonding is described, as well as the notions of ionic character, bond radii, electronegativities, and so forth, and there is a description of the empirical relations that are often used to systematize structural properties.

Part 2 deals with nontransitional elements and thoroughly illustrates the ideological and theoretical concepts that were treated in part 1. This is a strong section in which a lot of good descriptive chemistry is explained, in most cases as adequately as current models will permit. The choice of topics is decidedly modern, and most, if not all, of the results of interest in inorganic chemical spheres today are mentioned.

The third part of the book, comprising 50 percent of its pages, is devoted to transition elements. A very brief review of certain topics in classical physical chemistry is followed by a descriptive introduction to crystal and ligand field theories. This, and the subsequent application to the understanding of the chemical and physical properties of this important class of elements and their compounds, is the best feature of the book. The extensive discussion from a chemist's point of view is, in its scope, original with these authors, and it should attract and influence young readers as well as chemists who have not followed the current literature. This section also includes a compact, up-to-date exposé of the chemistry of relatively rare and unfamiliar elements, which is not found in previous treatises of this size and purpose.

There are no references to the literature, but there is a bibliography at the end of each chapter.

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Meteoritics

Meteorites. Brian Mason. Wiley, New York, 1962. xii + 274 pp. Illus. \$7.95.

A sufficient body of knowledge has been accumulated in the field of meteoritics so that it is practical and useful to offer a university course in the subject. This book admirably fulfills the requirements of a textbook for such a course; in addition, it should be a valuable compendium of data, ideas, and theories from the various disciplines that make up the integrated field, and, as such, it should be most useful to research workers.

The science of meteoritics is, as Mason states, a "borderline field par excellence." Other fields which are concerned with at least some particular aspect of the science are (in alphabetical order) astronomy and astrophysics, ballistics, geology, inorganic and organic chemistry (and, perhaps, biochemistry), metallography, meteorology, mineralogy, and nuclear and cosmic ray physics. Workers in these various fields should have a readable, decently indexed reference volume about meteorites per se. Until recently, none was available. Krinov's *Principles of Meteoritics* was the first reasonable attempt to fill this need. Mason's volume contains fewer details but is more readable and probably would be the better choice for a textbook. Insofar as the needs of researchers are concerned, Krinov's book is notably poor in its survey of current work by American and Western European scientists, but Mason is fairly thorough in this respect. Thus, the books complement each other rather well.

Meteorological aspects of meteorite fall are discussed in only a preliminary way. The complicated gallimaufry of meteorite classification systems is then set in order quite clearly, and this is followed by an alphabetically arranged description of extraterrestrial minerals. The various types of meteorites and the elements of their structural composition are described concisely but in sufficient detail. The chapter on meteorite ages, on the other hand, is rather sparse; the reader is referred instead to the recent article by Anders in the *Reviews of Modern Physics*, which gives a complete and detailed review of the subject. Theories of the origin of meteorites are briefly described, and a

complete and up-to-the-minute bibliography is included. (References as a whole are amazingly up to date.) A fairly detailed chapter on tektites is included. Mason has added two appendices: one is a discussion of the problems encountered in the chemical analysis of meteorites as compared with the analytical problems met in studying artificial alloys and terrestrial rocks, which is helpful in gaining a proper perspective of the data; the other is a geographically arranged list of the meteorites of the United States, the value of which is not quite clear to me. But Krinov has provided such a list for the U.S.S.R., so there. The bibliography is quite good; it will be a valuable feature of the book.

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Comparative Anatomy

The Vertebrate Body. Alfred S. Romer. Saunders, Philadelphia, ed. 3, 1962. vi + 627 pp. Illus. \$8.

This latest edition of a time-tested text retains most of the virtues of the preceding editions and has several added improvements. Extensive portions of the chapters dealing with vertebrate embryology and with cells and tissues have been revised and rewritten. A short but useful chapter on the endocrine organs effectively brings together material that was scattered throughout the text in previous editions. Some of the brief physiological discussions have been expanded and brought up to date (for example, muscle fiber function). There are many new, and for the most part excellent, illustrations; a few of the older ones have been deleted. Most of the histological illustrations of bone, muscle, connective tissues, and the like, which did not reproduce well as halftone drawings, have been replaced with linecuts for greater clarity; this effort was not uniformly successful, and a few of the linecuts are poor (for example, Figs. 257 and 357). Eight diagrams of blood vessels in color (four of them new), add considerably to the effectiveness of this type of presentation. Greatly improved illustrations of the distribution and component parts of spinal nerves, cranial nerves, sensory and motor nuclei, and cerebral hemisphere differentiation have

been achieved by adequate color reproduction.

Although the new edition adheres closely to the pattern of its successful predecessors, a few minor faults may be noted. The pages have a more congested appearance, because the lines of the text are closer together; this gives the impression that the type has been reduced in size, and it does not make for easier reading. Some of the illustrations have suffered in reproduction, and a few, which are now arranged horizontally instead of vertically, run off the edge of the page; this does not, however, diminish their usefulness. The section on the heart would have profited from discussion of recent work dealing with the anatomy and circulatory patterns involved in certain reptilian and anuran hearts and associated vessels.

Romer's book remains one of the most useful and valuable of all textbooks dealing with comparative anatomy at the level of the beginning student, in that it presents an effective and skillful synthesis of gross and histological anatomy, embryology, paleontology, and physiology at the comparative level, a treatment which is vital to a conceptual understanding of vertebrate morphology and evolution.

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New Books

Mathematics, Physical Sciences, and Engineering

Advances in Applied Mechanics. vol. 7. H. L. Dryden and Th. von Karman, Eds. Academic Press, New York, 1962. 337 pp. Illus. \$11.

Advances in Electrochemistry and Electrochemical Engineering. vol. 2, *Electrochemical Engineering*. Charles W. Tobias, Ed. Interscience (Wiley), New York, 1962. 309 pp. Illus. \$12.

Advances in Geophysics. vol. 9. H. E. Landsberg and J. Van Mieghem, Eds. Academic Press, New York, 1962. 385 pp. Illus. \$14.50.

Advances in Nuclear Science and Technology. vol. 1. Ernest J. Henley and Herbert Kouts, Eds. Academic Press, New York, 1962. 366 pp. Illus. \$12.

Analysis and Design of Inertial Guidance Components. Ira Cochin. Razdow Laboratories, Newark, N.J., 1962. 165 pp. Illus. Paper, \$5.

Asphalt. Science and technology. Edwin J. Barth. Gordon and Breach, New York, 1962. 720 pp. Illus. \$32.50.

Astronomy in Action. Robert S. Richardson. McGraw-Hill, New York, 1962. 191 pp. Illus. \$3.95.

Calculations in Physical Chemistry. B. W. V. Hawes and N. H. Davies. Wiley, New York, 1962. 217 pp. Illus. \$4.50.

The Classical Theory of Fields. L. D. Landau and E. M. Lifshitz. Translated from the Russian by Morton Hamermesh. Pergamon, London; Addison-Wesley, Reading, Mass., 1962. 413 pp. Illus. \$14.50.

A Dictionary of Electronics. S. Handel. Penguin Books, Baltimore, Md., 1962. 384 pp. Illus. Paper, \$1.65.

Flight Mechanics. vol 1, *Theory of Flight Paths*. Angelo Miele. Addison-Wesley, Reading, Mass., 1962. 427 pp. Illus. \$10.

Fundamental Problems in Turbulence and Their Relation to Geophysics. Symposium, Marseilles, France, September 1961. Francois N. Frenkiel, Ed. American Geophysical Union, Washington, D.C., 1962. 236 pp. Illus. \$5.

Gas Chromatography. Principles, techniques, and applications. A. B. Littlewood. Academic Press, New York, 1962. 525 pp. Illus. \$15.

The Green Function Method in Statistical Mechanics. V. L. Bonch-Bruевич and S. V. Tyablikov. North-Holland, Amsterdam; Interscience (Wiley), New York, 1962. 263 pp. Illus. \$9.75.

Inorganic Polymers. F. G. A. Stone and W. A. G. Graham, Eds. Academic Press, New York, 1962. 642 pp. Illus. \$19.50.

International School of Physics "Enrico Fermi." Proceedings. Course 14, *Ergodic Theories*, P. Caldirola, Ed. (252 pp. \$7.50); Course 16, *Physicomathematical Aspects of Biology*, N. Rashevski, Ed. (524 pp. \$16); Course 17, *Topics in Radiofrequency Spectroscopy*, A. Gozzini, Ed. (320 pp. \$10). Academic Press, New York, 1962. Illus.

Mechanical Properties of Metals. D. McLean. Wiley, New York, 1962. 418 pp. Illus. \$12.

The Metallurgy of Tool Steels. Peter Payson. Wiley, New York, 1962. 362 pp. Illus. \$15.50.

Orbitals in Atoms and Molecules. Chr. Klixbull Jorgensen. Academic Press, New York, 1962. 169 pp. Illus. \$6.

Polyhydric Alcohols. Ibert Mellan. Spartan, Washington, D.C., 1962. 214 pp. Illus.

Principles of Aeroelasticity. Raymond L. Bisplinghoff and Holt Ashley. Wiley, New York, 1962. 536 pp. Illus. \$25.

Reflection and Refraction of Progressive Seismic Waves. L. Cagniard. Translated and revised by Edward A. Flinn and C. Hewitt Dix. McGraw-Hill, New York, 1962. 302 pp. Illus. \$11.

Treatise on Analytical Chemistry. pt. 2, *Analytical Chemistry of the Elements*. I. M. Kolthoff and Philip J. Elving, Eds. Section A, *Systematic Analytical Chemistry of the Elements*. vol. 2, *Gallium-Indium-Thallium, Silicon, Germanium, Iron, Cobalt, and Nickel*, Charles V. Banks et al. (491 pp.); vol. 9, *Uranium, the Transuranium, and Actinide Elements*, Glenn L. Booman et al. (507 pp.). Interscience (Wiley), New York, 1962. Illus. \$18 each.

Varactor Applications. Paul Penfield, Jr., and Robert P. Rafuse. Massachusetts Institute of Technology Press, Cambridge, 1962. 637 pp. Illus. \$15.