importance. He succeeds in reaching the reader because of his complete familiarity with the many languages of this polyglot subject, switching from one language to another often enough to enable any serious reader, regardless of background, to follow the trend of the argument.

It should not be inferred that all readers will find this an easy book to read. As a case in point, the author refers to the MacAdam limits of the color solid without further explanation. Readers who have been softened by the kind of systematic development of a subject that is found in most textbooks might be tempted to read no farther. In the opinion of this reviewer this would be a mistake, because the treatise is so broad in its scope as to preclude formal elucidation of all the details. In the particular instance cited above, the context makes clear that there are established limits to the size of the color solid in the case of nonluminescent reflecting surfaces, and a reference to MacAdam's original paper provides the reader with a ready means of supplementing his knowledge if he so desires.

The book is divided into three parts, the first of which reviews certain basic facts concerning the eye, the various aspects of color, the operations of color-matching in a physical sense, and the effect of these matches on both normal and abnormal observers. Part II is entitled "Tools and Technics" and deals principally with spectrophotometers, colorimeters, color atlases, and color languages. Part III, on the "Physics and Psychophysics of Colorant Layers," clarifies the concepts of gloss, opacity, hiding power, etc., and then poses the practical problem of color-matching, demonstrating the use of the Kubelka-Munk analysis in this connection.

This volume is remarkably free from errors of fact, the most serious error noted by this reviewer being the implication that six cameras instead of only three are required for correct color rendering in an idealized color television system.

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Mathematics: Its Magic and Mastery. 2nd ed. Aaron Bakst. New York: Van Nostrand, 1952. 790 pp. $6.00.

This book, originally published in 1941, now appears in a second and revised edition. The material covered is essentially high school mathematics and mechanics. Many entertaining facts and parlor tricks are included; but the assertion on the jacket that "Einstein's concept of relativity and the theory of the expanding universe are explained so simply that they can be readily appreciated by any layman" is amazing, for these matters actually receive no more than a mere mention—say, about 10 words.

The author states in the preface that "no proofs of any kind are used in the unfolding of the mathematical processes and properties." Fortunately this program is not strictly followed, for mathematics without reasoning is no longer mathematics. Its "magic" may remain, but its "mastery" is out of the question. Indeed, the author frequently does give reasons for his statements, although they are often diffuse and lacking in precision. Thus in "How to Make Money in the Box Business" (p. 568 *et seq.*), the author spends several pages in finding out which of the two positive quantities, $k^2/16$ or $(k^2/16) - a^2$, is the larger. Essentially the same question arises in the problem of sawing out the biggest beam from a given log of radius r. Three pages (574–76) are devoted to this problem without a really sharp proof. If x, y are the beam's dimensions and A its section area, we have

$$A^2 = x^2y^2 = x^2(4r^2 - x^2) = (2r^2)^2 - (x^2 - 2r^2)^2.$$

A is evidently a maximum when the subtracted quantity is zero; that is, when $x = r\sqrt{2}$. This clear-cut result involves no more algebra than that actually used in the book and occupies but one tenth the space.

In this revised edition some errors still remain. A very curious one appears on page 349 in connection with the value of a lottery ticket—computed as the price paid for the ticket times the probability of winning a prize. Again, on page 701, the foot-pound is regarded as the unit of force.

The book concludes with an appendix that gives a serviceable outline of elementary algebra, geometry, and trigonometry. Four-place tables of logarithms, squares, square roots, sines, cosines, and tangents are also included, as well as a comprehensive index.

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Structural Chemistry of Inorganic Compounds, Vol. II. Walter Hückel; trans. and rev. by L. H. Long. Amsterdam-Houston: Elsevier, 1951. 653 pp. $13.50.

The purpose of this treatise, as stated in Volume I (SCIENCE, **113**, 253 [1951]), is to provide inorganic chemistry with a basis for its systematization: "Namely, a structural and constitutional theory in one embracing representation." In this volume the author discusses the volatile inorganic molecules, crystal structure, silicate chemistry, metallic substances, and the chemical reaction in inorganic chemistry.

After studying the two volumes, the reader is still looking for the "one embracing representation." The closest approach to a basis for systematization is the emphasis on bond types and interatomic distances, but there is not even a table of bond energies, and the thermodynamics of inorganic chemistry is completely neglected.

As a summary of the literature on the structure of molecules and crystals, the volumes are to be commended. The discussion of ionic radii and lattice forces in Volume II is good, and the comparison of the values given by Goldschmidt, Pauling, and Zachariasen is useful. Unfortunately, the reference to the work of Zachariasen is to his 1931 paper and does not include his revised values.

In the treatment of the strength of acids and bases

no mention is made of the G. N. Lewis theory, nor is there any discussion of the effect of formal charge on acid strength. In particular, the section on the chemical reaction suffers from the general inability to use structure to predict reactivity except to a limited degree.

The volumes are valuable as a reference to all phases of molecular structure. The historical development of fundamental chemical concepts is excellent and gives a special charm to many chapters.

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The Chemistry of Heterocyclic Compounds: Thiophene and Its Derivatives. Howard D. Hartough, with special chapters by F. P. Hochgesang and F. F. Blicke. New York–London: Interscience, 1952. 533 pp. $16.50; sub. price, $15.00.

This book is the third in a series of monographs on "The Chemistry of Heterocyclic Compounds" (Arnold Weissberger, consulting editor). The present volume thoroughly and critically covers and catalogues the literature on thiophene published prior to October 1949. Condensed ring systems containing thiophene rings are scheduled for publication in a separate volume.

The opening chapter presents a general discussion of thiophene: its detailed history, occurrence, isolation, nomenclature, analysis, etc. This is followed by a review by F. F. Blicke of the biological and pharmacological activity of thiophene and its derivatives. There is also a special chapter by F. P. Hochgesang on the spectrochemical and related properties of thiophene compounds; this includes much unpublished data. Several sections consider such topics as the synthesis, physical properties, and special reactions of thiophene and its homologs, and factors affecting substitution reactions in thiophene and its derivatives. In the remaining ten chapters, the syntheses and properties of various classes of thiophene compounds and their selenium and tellurium analogs are considered.

Valuable aid in the laboratory preparation of derivatives of thiophene is offered by the final section. It presents satisfactory methods for the synthesis of approximately 30 different compounds; many of the procedures were checked independently.

Steinkopf's book, *Die Chemie des Thiophens,* is also an exhaustive treatment of this subject; however, it was published in 1941. In view of the rapid progress in thiophene chemistry since 1944, Dr. Hartough, who has made several contributions to the recent literature in this field, has filled a great need by his book. Furthermore, it is well written and organized, and throughout the monograph liberal use is made of references to the original literature. It will be useful to chemists working in this field and as a text in seminars or courses at the graduate level.

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Scientific Book Register

Journal of Researches into the Geology and Natural History of the Various Countries Visited by H. M. S. Beagle. Fac. repr. of 1st ed., 1839. Charles Darwin. New York–London: Hafner, 1952. 615 pp. and plates. $7.50.

Problems of Aging. Transactions of the Fourteenth Conference, September 7–8, 1951, St. Louis. Nathan W. Shock, Ed. New York: Josiah Macy, Jr. Fdn., 1952. 138 pp. $3.00.

A Hundred Years of Anthropology. 2nd ed. T. K. Penniman, with contributions by Beatrice Blackwood and J. S. Weiner. London: Duckworth; New York: Macmillan, 1952. 512 pp. $5.00.

The Electromagnetic Field. Repr. Max Mason and Warren Weaver. New York: Dover, 1952. 390 pp. $3.95; paperbound, $1.85.

Pathologie Chimique, Vol. II. Michel Polonovski, Ed. Paris: Masson, 1952. 770 pp.

An Explaining and Pronouncing Dictionary of Scientific and Technical Words. 10,000 scientific and technical words in 50 subjects explained as to a person who has little or no knowledge of the particular subject. W .E. Flood and Michael West; illus. by Charles A. Baker. London–New York: Longmans, Green, 1952. 397 pp. $2.25.

Acids and Bases: Their Quantitative Behaviour. R. P. Bell. London: Methuen; New York: Wiley, 1952. 90 pp. $1.50.

Diagnostic Electroencephalography. Hans Strauss, Mortimer Ostow, and Louis Greenstein. New York: Grune & Stratton, 1952. 282 pp. $7.75.

The Zoological Record, Vol 86. Records of zoological literature relating chiefly to 1949. Malcolm Smith, Ed. London: Zoological Society, 1952. 19 sections. £6 for complete volume, with special prices for separate sections.

Renal Function. Transactions of the third conference, October 18–19, 1951, New York. Stanley E. Bradley, Ed. New York: Josiah Macy, Jr. Fdn., 1952. 210 pp. $3.50.

Advances in Enzymology and Related Subjects of Biochemistry, Vol. XIII. F. F. Nord, Ed. New York–London: Interscience, 1952. 413 pp., incl. cumulative index for Vols. I–XIII. $8.50.

Die Chirurgie des Dickdarms. Wiener Beiträge zur Chirurgie, Vol. VII. Hans Finsterer. Vienna–Düsseldorf: Wilhelm Maudrich, 1952. 382 pp. $12.50.

Parasitism and Symbiosis. Maurice Caullery; trans. by Averil M. Lysaght. London: Sidgwick and Jackson; New York: Macmillan, 1952. 340 pp. $5.50.

Spatial Vectorcardiography. Arthur Grishman and Leonard Scherlis. Philadelphia–London: Saunders, 1952. 217 pp. $6.00.

The Shoals of Capricorn. A 20,000-mile expedition to the Seychelles Islands in the Indian Ocean. F. D. Ommanney. New York: Harcourt, Brace, 1952. 322 pp. $4.00.

Correction: It has been called to my attention that in my review of *Contributions to Embryology,* Vol. XXXIV, which appeared in SCIENCE, May 23 (**115**, 580 [1952]), I stated that the paper "On Cyclic Changes in the Endometrium of the Macaque" was by "Bartelmez, with the collaboration of Corner and Heuser." The authorship should have read "Bartelmez, with the collaboration of Corner and Hartman."—A. ELIZABETH ADAMS.