

will be forced to obtain (by purchase, presumably) all three volumes.

Volume III of *The Vitamins* is a series of six chapters on recognized vitamins and one chapter on compounds either relatively new to the field or as yet unidentified. The chapters are as follows: *p*-Aminobenzoic acid (five authors); Pteroylglutamic acid (three authors); Pyridoxine and Related compounds (eight authors); Riboflavin (five authors); Thiamine (five authors); The Tocopherols (three authors); New and unidentified growth factors (one author).

The plan of presentation throughout the series is uniform for all compounds and includes nomenclature, chemistry, industrial preparation, biochemistry, estimation and standardization, occurrence, deficiency effects, pharmacological considerations and requirements. This becomes monotonous, but when one considers the series as reference material it must be admitted that this style and uniformity is most easily used.

The editors and publishers have produced an invaluable series, and volume III maintains the high standard set by volumes I and II, wherein one may find essentially all the important published material on the compounds which have the status of vitamins (and some which do not). In choosing the specialists for the various sections, the editors have been wise, and the result is the focusing of attention on the compounds, in all their intricate facets. From the biochemical standpoint this emphasis circumvents the concentration on any one phase of interest and any one group of organisms.

This reviewer finds it difficult to single out any one section for special praise, although the one on *p*-Aminobenzoic Acid is particularly valuable because this special subject has not been adequately reviewed elsewhere. The series will be of interest to all students of metabolism and should be extremely helpful to the organic chemist, not only for the review of reactions leading to the syntheses of metabolically active compounds, but because it will allow him to gain understanding into the complex relations between the products of his reaction flask and the reactions within the organism.

The printing is clear and the figures are well executed. Extensive bibliographic references are carried as footnotes for each subchapter, which leads to extensive duplication. Inevitably a few errors appear to have escaped the proof-readers (*e.g.*, a triaminohydroxypyridine, instead of the corresponding pyrimidine on page 105). Most, however, will not lead to confusion.

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GEORGE W. KIDDER

Substances Naturelles de Synthèse. Volume VIII. Edited by LÉON VÉLUZ, Docteur ès Sciences Physiques. Masson et Cie, Éditeurs, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris VI, France. 1954. 157 pp. 16 × 22.5 cm. Broché, 1,800 fr.; Cartonné toile, 2,200 fr.

Substances Naturelles de Synthèse. Volume IX. Edited by LÉON VÉLUZ, Docteur ès Sciences Physiques. Masson et Cie, Éditeurs, Libraires de l'Académie de Médecine, 120, Boulevard Saint-Germain, Paris VI, France. 1954. 186 pp. 16 × 22.5 cm. Broché, 1,800 fr.; Cartonné toile, 2,280 fr.

These latest volumes in this useful series follow the pattern of earlier volumes. Each is divided into three sections: Preparations, Methods, "Practical Note." Volume VIII gives detailed procedures for preparing nicotinic acid, DL-tuberculoic acid, dicoumarol, hydrocortisone, tryptamine and DL-tryptophan. Volume IX contains synthetic methods for 3-indoleacetic acid, DL-cystine, DL-hydroxylysine, spermine, testosterone-4-C¹⁴ and thymine. The experimental directions are those given in the journal literature. Each procedure is preceded by a short historical and explanatory introduction and is followed by interesting and useful notes discussing reactions involved in the preparation described, other methods for synthesizing the product, related compounds and their preparation, and similar topics. Each volume contains a frontispiece with photomicrographs of four of the compounds for which preparative procedures are given.

The second section of volume VIII consists of concise reviews of (1) reduction by means of double hydrides and (2) the synthesis of saturated aliphatic monocarboxylic acids. The subjects considered in this section of volume IX are (1) the synthesis of labeled natural products and (2) the resolution of racemic forms. Each review has tables listing examples of the methods discussed together with literature references. Although the illustrations are numerous and varied, the value of these tables would be considerably increased if they gave a more comprehensive coverage of the literature and if yields were indicated.

Procedures for the preparation of lithium aluminum hydride, lithium borohydride and sodium borohydride constitute the third section of volume VIII, while the corresponding section of volume IX describes methods for preparing sixteen optically active reagents used to resolve racemic forms.

The volumes have the pleasing format of preceding ones.

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Ephraim's Inorganic Chemistry. Sixth Edition—Revised and Enlarged. Edited by P. C. L. THORNE, M.A. (Cantab.), M.Sc., Ph. D. (Lond.), F.R.I.C., Formerly H. M. Staff Inspector for Chemistry, Ministry of Education, Sometime Lecturer in Chemistry at Sir John Cass College, London and at Woolwich Polytechnic, and E. R. ROBERTS, A.R.C.S., Ph.D. (Lond.), Ph.D. (Minnesota), D.I.C., Senior Lecturer in Chemistry at the Imperial College of Science and Technology. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. xii + 956 pp. 17.5 × 24.5 cm. Price, \$6.25.

In this edition of Ephraim's well-known reference book on inorganic chemistry, the novel and instructive approach which characterized the earlier editions has been continued without alteration. By presenting together as classes elements or compounds of similar types and characteristics, this type of approach achieves a degree of logic and a type of systematization not to be found in many other treatments. A wealth of information, especially of a descriptive type, is presented, and no library on inorganic chemistry should be considered complete without a copy of this reference.

It is debatable, however, whether one who owns an older edition of the book would find it desirable to acquire this edition. Except for a few minor changes, particularly in relation to atomic structure, the bulk of the book has been reprinted without alteration and is thus scarcely a revision in the absolute sense of the word. A detailed check of references to papers appearing since the preceding edition reveals that only a very small segment of the tremendous inorganic literature which has accumulated in this fruitful period has been covered. This the reviewer regards as unfortunate because it subordinates important new concepts and discoveries and creates the impression that progress in inorganic chemistry has been immeasurably less than is actually true. The authors' limitation of the net increase in size of the book to some seventeen pages is commendable, but to say that this "has been made possible by skilful replacement of old by new matter made available since the last edition" (Preface) is not completely indicative of what has been done. It is to be hoped that in future editions more thorough revision with adequate and completely indexed literature coverage will seem desirable to the authors.

The book is well and clearly printed in a type size which is not tiring to read. All in all, it is an attractive volume.

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THERALD MOELLER

Nuclear Theory. By ROBERT G. SACHS, Professor of Physics, University of Wisconsin. Addison-Wesley Publishing Company, Inc., Cambridge 42, Massachusetts. 1953. xi + 383 pp. 16 × 23.5 cm. Price, \$7.50.

This introduction to theoretical nuclear physics is intended for persons already possessing a knowledge of quantum

tum mechanics at the graduate level. It starts with a very good qualitative discussion of the orders of magnitude of quantities of physical interest in this field and a clear presentation of the general ideas used in understanding the main features of nuclear structure, but rapidly becomes detailed and mathematical. The level of treatment varies from section to section, and in a subject such as nuclear physics where existing theoretical ideas are necessarily tentative, the inclusion of more empirical material probably would prove useful to the student.

Nearly half the book is devoted to a thorough discussion of the two body problem, that is n-p and p-p interactions as revealed in the properties of the deuteron and low energy scattering. This section also serves the function of introducing the student to many of the techniques and ideas of basic importance to our present understanding of nuclear problems. The chapter on the meson theory of nuclear forces is intended to indicate the connection (if any) between this field and the subject of interest here, rather than as an introduction to meson theory. Three body problems are handled by the methods already introduced, and an introduction to supermultiplet theory and Mayer-Jensen coupling is included. Electromagnetic interactions with nuclei are considered in detail. The section on nuclear reactions includes a qualitative discussion of stripping reactions in addition to a fairly detailed treatment of the general problem. The concluding chapter on β -decay is confined to the non-covariant treatment of allowed transitions, and briefly indicates the type of information on nuclear structure that such transitions give.

It is clear from the topics covered that the author has presented a personal selection rather than a comprehensive survey, and the coherence the book achieves is individual rather than logical. This is a very useful and interesting book for anyone working in the nuclear field, but will prove most valuable if used in conjunction with other sources.

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H. P. NOYES

Chemical Pathways of Metabolism. Volume II. Edited by DAVID M. GREENBERG, Department of Physiological Chemistry, School of Medicine, University of California, Berkeley, California. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. viii + 383 pp. 16 X 23 cm. Price, \$9.50.

Of particular importance to workers concerned with the metabolism of nitrogen-containing compounds, this last of the two-volume series will also interest all workers concerned with the broadest aspects of metabolism. The unity and integration of this group of articles will give it a special value for graduate students and workers in related fields.

The early chapters are concerned with the metabolism of amino acids. The first of these is written by P. P. Cohen, who devotes an excellent chapter to the nitrogen moiety of amino acids, emphasizing the transferring or transforming of the amino, amine and amide nitrogen.

The editor himself deals with the catabolic pathways of the carbon portion of the amino acids very comprehensively and in a succeeding chapter takes up the role of amino acids in the biosynthesis of other amino acids, phosphatides, nicotinic acid, thyroxine and epinephrine. He devotes a separate chapter to the sulfur-containing amino acids and the metabolism of other sulfur compounds.

H. Borsook writes a stimulating chapter on the problem of the enzymatic synthesis of peptide bonds, developing the subject principally from a consideration of the energetics involved. In a well-organized chapter, Martin P. Schulman reviews the biosynthetic and catabolic processes involving the purines and pyrimidines. Leon A. Heppel takes up the nucleotides and nucleosides, discussing the enzymes which act on these compounds as well as the biosynthetic processes starting with the preformed bases. S. Granick presents a chapter concerned with the biosynthetic steps leading to the formation of heme and chlorophyll, touching lightly on the structure, chemistry and properties of these

compounds. He offers a scheme for the catabolism of the iron-containing tetrapyrroles to bile pigments, complete with structural formulae to conclude this section.

While, as with any volume of this type, there are the usual reference errors, the well-documented chapters add further to its usefulness as a reference work. The book also includes a complete subject and author index.

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Nuclear Species. By H. E. HUNTLEY, B.Sc., Ph.D. F.Inst.P., Professor of Physics, University College of the Gold Coast. St. Martin's Press, Inc., 103 Park Avenue, New York 17, N. Y. 1954. xix + 193 pp. 14.5 X 22 cm. Price, \$4.50.

There is a largely empirical aspect of nuclear physics which treats the energy or mass relations of nuclear species according to their numbers of protons and neutrons and whether or not these numbers are even or odd. From the regularities observed have arisen more sophisticated approaches to the basic problems of nuclear binding and to the formulation of nuclear models which attempt to correlate the properties of complex nuclei. The wholly commendable objective of arriving at a system which explains nuclear properties on the basis of quantum mechanical principles has had the effect of largely eliminating from recent books any detailed presentation of the empirical stability relations which form an invaluable basis for any consideration of nuclear properties. As a result, it is probable that most present day students of nuclear science finish their formal education without a desirable consciousness of the broad patterns of stability relationships which exist among all of the nuclear species.

With these thoughts in mind, it seems to this reviewer that a monograph on empirical stability relations such as this unpretentious volume entitled "Nuclear Species," can serve a useful purpose. The organization of the book is good. There are two introductory chapters which describe some of the simple concepts of nuclear structure as background material for the remainder. Following these are chapters on the measurement of isotopic masses, the pattern of naturally occurring (mostly beta-stable) forms, their relations to the unstable forms, binding energies of nuclei, semi-empirical treatment of nuclear mass, and a couple of brief chapters on the spectroscopic designation of nuclear energy states. Finally there is a chapter on the ideas of the origin of the elements which must, of course, explain the isotopic forms and abundances which are present in nature. Most of the material covered is inherently simple and its understanding requires no mathematical skills and little background in classical physics.

There is little question that many students of nuclear science could benefit by reading this book. It has, however, some shortcomings which should be mentioned.

As a general criticism, many of the explanatory passages could be strengthened. Not infrequently is there allusion to a particular phenomenon as having no explanation when, indeed, a good deal could be said about the subject. One also wonders whether the reader will derive a proper perspective on the different forms of nuclear *stability* since the term is often used vaguely. It may also be that too much emphasis is placed on a long list of "stability rules" and that a number of the discussions of beta-stability would have benefited by consideration of the degree of stability or instability. With admitted prejudice, this reviewer also feels that a wealth of pertinent information on nuclear stability lies in the properties of the translead and transuranium elements and this not inconsiderable part of the periodic table has been virtually by-passed. Finally, it is necessary to mention that the book contains a sizeable number of trivial errors of fact and that some of the illustrative data used has been shown in recent years to be in error.

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