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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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 × 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 × 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 transplead 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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