

description of normal anatomy followed by a discussion of the various pathologic entities, their incidence, possible etiologic factors, the clinical pathology, and clinical correlations. The latter should prove of particular value to veterinarians in practice.

The first section, which deals with the urinary system, includes discussions on the kidney, urolithiasis, renal pelvis and ureter, the urinary bladder, and the urethra. In my opinion this section is particularly excellent.

The second section concerns the male genital system and includes discussions on hermaphroditism and pseudohermaphroditisms, the testis and epididymis, the spermatic cord, vas deferens, scrotum, penis, and prostate. The organization and coverage of this section is adequate and complete.

The third chapter, or section, deals with the female genital system and includes a discussion of the sexual cycle, the vulva, vagina, uterus, pregnancy and the placenta, the Fallopian tubes, ovary and mammary gland. Like the first two sections, this one is very complete.

The faults of the text are really minor and include a poor main title and a very poor index. The subtitle should be incorporated into the title of the text, which coverwise is misleading. There is a wealth of good information in the text which, unfortunately, cannot be found in the index. For example, there is an ample discussion of blood and urine alterations throughout the text, yet neither subject appears in the index.

In my opinion this book is a definite contribution and can be recommended highly to the veterinary profession as well as to those scientists who utilize the dog or cat as an experimental animal.

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Higher Transcendental Functions. vol. III. Based in part on notes left by Harry Bateman. Bateman Project Staff, A. Erdélyi, Ed. McGraw-Hill, New York-London, 1955. xviii + 292 pp. \$6.50.

This is the last of the five volumes produced by the Bateman Manuscript Project [see *Science* 120, 302 (1954); 121, 464 (1955)]. Sections on Lamé functions, Mathieu functions, spheroidal and ellipsoidal wave functions, and miscellaneous functions (such as Mittag-Leffler's *E*-functions and the "higher trigonometric functions") follow the pattern of the earlier volumes: a survey of important formulas with full references to the specialized literature for proofs and further details.

There are also three chapters of a different character: an introduction to automorphic functions and a chapter on number-theoretical functions, both characterized by the editor as "frankly experimental"; and a chapter on generating functions. The first is a concise elementary survey, intended as background for some explicit examples. In the second, little unity or coherence is possible, but there is probably no single book on number theory in which all the information in this chapter appears. The chapter on generating functions (in the sense of functions whose power series have an interesting set of functions as coefficients) is a collection of results linked by an accidental similarity of form. Examples are given to indicate various ways in which generating functions are used. Unfortunately there is no way of predicting whether a given set of functions will have a useful generating function. However, anyone confronted with the power series of a complicated function containing a parameter will do well to look here to see whether the coefficients have already been investigated.

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World Outside My Door. Olive Bown Goin. Macmillan, New York, 1955. vi + 184 pp. Illus. \$3.50.

Mrs. Goin is first and foremost a housewife, the publisher tells us; her household consists of her husband, an associate professor of biology at the University of Florida, two children, and two cats. Mrs. Goin's training as a biologist (mammalogist) and her obvious ability as a naturalist, combined with an artist's enjoyment of color and movement and a warm outlook on life, make her book alive, enjoyable, and, where she permits her biological training to dominate, most accurate.

A half-acre of backyard in a southern city becomes a Fabresque field for observation. *Bipalium* lives with marsh peepers, turtles, rain frogs, cardinals, and rabbits—all in balance with four human beings.

For those who prefer *Elaphe obsoleta quadrivittata* to four-lined chicken snake, there is an appendix listing some 70 species of vertebrates she has observed.

Mrs. Goin apparently believes that the naturalist's field is all life, and this total view blends her backyard into the community that naturalists have fashioned wherever they have tried to describe microorganisms (Leidy) or the animals of the African veldt (Akeley). So a rain frog's habits are projected into its evo-

lutionary past, the spade-foot's activity is related to temperature, and the peck order of birds is noted and pondered.

Naturalists, young and old—and those who should be naturalists—should seek Mrs. Goin's company, if in no other way than through her book.

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Biochemistry of Nitrogen. A collection of papers on biochemistry of nitrogen and related subjects. Dedicated to Artturi Ilmari Virtanen. N. J. Toivonen, E. Tommila, *et al.*, Eds. Annales, Series II, Chémica. Suomalainen Tiedekatemia, Helsinki, 1955. 535 pp. Illus. + plates. \$12.

This Festschrift contains 48 papers from 14 countries on the biochemistry of nitrogen and related subjects. It is dedicated to Nobel laureate Artturi Ilmari Virtanen on the occasion of his 60th birthday. Most of the articles are in English, the others are in German and French.

The scope of the subjects represented reflects the range of interests and versatility of Virtanen. Thus there are articles on nitrogen fixation, reduction of nitrate, the biochemistry of nitrogen-deficient microorganisms, oxidation of amino acids by mitochondria, protein metabolism in cell nuclei, amino acids in protein-rich and protein-poor *Rhodotorula gracilis*, protein and nucleic acid contents of developing *Chlorella*, antibiotics and nitrogen excretion by microorganisms, inhibitory effect of Swedish rosy milk on fungi, symbiosis in bacterial biosynthesis, mutations and adaptations in bacteria, and free amino acids of the pea plant.

There are discussions concerning the effect of irradiation on the formation of hemoglobin, reversible splitting of hemoglobin, the prosthetic groups of cytochrome oxidase and cytochrome *a*, polymers of aminosugars, the significance of macromolecules, combination of phytyc acid with protein, studies on the metabolism of citrate, tyrosine and tryptophan, and isotopically labeled fructose, milk proteins in nutrition, electronegativity (Pauling), magnesium diabetes, reductone, chaconin, and γ -aminobutyrate.

There are descriptions of column chromatography of proteins, immunoelectrophoresis, the enzymatic syntheses of adenosine, and chemical syntheses of nucleotide coenzymes, a pyridine nucleoside, peptides, and isotopically labeled kynurenine. Two phases of photosynthesis are described by Calvin and by Warburg, both with associates. Enzymes discussed include pancreatic lipase, hy-

droxylamine reductase, yeast invertase, phosphotransferases, citrulline phosphorylase, and two transaminases.

Jorgensen has discussed a broadened concept of buffers based on Brønsted's acid-base definition. Special mention is also to be made of an article by F. C. Stewart and associates on "Nitrogenous components in plants: recent knowledge derived from paper partition chromatography." This comprehensive review includes diagrams and extensive tables of value to the investigator; R_F values for 160 nitrogenous substances are presented.

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Radioisotope Conference, 1954. vol. II, *Physical Sciences and Industrial Applications*. Proc. Second Conference, Oxford, 19-23, July. J. E. Johnston, Ed. Academic Press, New York; Butterworths, London, 1954. ix + 223 pp. Illus. \$7.50; vols. I and II, \$16.

This volume is a collection of 24 journal-style papers that were presented at the Radioisotope Conference held at Oxford in July 1954. Almost without exception, these papers will be found to be both interesting and informative to any scientist or engineer who is interested in the applications of radioisotopes to industrial and research problems. However, although a small volume such as this might have been enough 8 years ago to have provided a comprehensive survey of radioisotope applications, for the year 1954 it is only a very limited collection of isolated examples of such applications. None of the papers is of a review type, and most of the work had already been described, or was subsequently described, in the usual journal literature.

Thirteen of the papers deal with the application of radioisotopes to industrial problems. Some of the more generally interesting examples of these papers are (i) determinations of the thicknesses of metal sheets by selectively measuring back-scattered gamma radiation, (ii) the use of ionized air to overcome electrostatic-charge hazards in hospitals and industry, (iii) determinations of the expected life of cutting tools from the rate of disappearance of radioisotopes formed by neutron irradiation, (iv) use of gamma radiation for the sterilization and pasteurization of foods, and (v) the use of radioisotopes in industrial radiography. However, as an example of the noncomprehensive nature of the collection, the fact may be cited that there is not a single paper dealing with any phase of the now very great use of radioisotopes in petroleum exploration and refining.

Eleven of the papers may be regarded

as dealing with the use of radioisotopes in chemical and physical research. Outstanding papers among this collection are (i) use of C^{14} in a study of the Wagner-Meerwein rearrangement involving 1,2,2-triphenylethanol and its derivatives, (ii) the application of the catalytic isomerization of cycloalkanes to the synthesis of aromatic compounds randomly labeled with C^{14} in the ring, (iii) a method for measuring the deuterium content of water by the neutrons produced from gamma irradiation of the water, (iv) gas counting (as acetylene in proportional counters) of natural C^{14} , and (v) liquid-scintillation counting of low specific activity C^{14} (as acetylene in toluene solution).

The Radioisotope Conference was undoubtedly very successful, and many of the papers presented there are highly interesting. However, the price for this very limited group of papers is entirely too high to permit my recommending it to individual purchasers.

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Outlines of Enzyme Chemistry. J. B. Neilands and Paul K. Stumpf. Wiley, New York; Chapman & Hall, London, 1955. x + 315 pp. Illus. \$6.50.

Enzymology is a rather young and rapidly growing branch of general biochemistry. The beginning student is confronted with a confusing journal literature and several highly specialized books on the properties of enzymes. Moreover, the language in enzymology has become so full of jargon that the beginning student often feels excluded from this field.

Refreshing efforts to change this situation were recently made by E. Baldwin in his stimulating treatise on the *Dynamic Aspects of Biochemistry* and by J. S. Fruton and S. Simmonds in their lucid presentation of *General Biochemistry*. These books have exerted a very stimulating influence on many senior college and graduate students by enabling them to grasp the significance of enzyme studies and subsequently to read more intelligently the complex and specialized literature.

The book *Outlines of Enzyme Chemistry* will undoubtedly contribute further to these efforts to provide a more adequate background for the beginning enzymologist. The volume is divided into four parts. The first two parts, which comprise more than half of the book, are devoted to elementary physical chemical aspects of enzymology, including brief chapters on isolation methods and characterization of proteins. The third part deals with specific coenzymes and en-

zymes. It includes several tables and a listing of enzymes. The fourth part is entitled "Metabolic patterns" and deals with some selected processes of carbohydrate metabolism and fatty acid oxidation. The book closes with a short but excellent chapter by Roger Y. Stanier on the synthesis of enzymes.

The 24 chapters of the book are well written and are comparatively free of major errors. However, the presentation of the material is somewhat unbalanced with respect to the background of knowledge required of the reader. Since, in the first half of the book very elementary aspects of physical chemistry, such as the ionization of weak acids and bases, are discussed rather extensively, the second half of the book appears very condensed by comparison. For example, alcoholic fermentation is presented by one figure, two tables, and a little more than one page of text. No mention is made of many important and interesting enzyme mechanisms of the urea cycle and nucleic acid and amino acid metabolism.

These and other omissions detract from the value of the book for the beginning student. In spite of these shortcomings, which can be avoided in later editions, the volume represents a very useful contribution to the teaching of enzymology. Taken as a whole, this book may be said to fulfill the aim of the authors to introduce senior undergraduate and beginning graduate students to the general subject of enzymology.

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The Theory of Cohesion. An outline of the cohesive properties of electrons in atoms, molecules, and crystals. M. A. Jaswon. Interscience, New York; Pergamon, London, 1954. viii + 245 pp. Illus. \$5.75.

This is the second volume of a new series of monographs on metal physics and physical metallurgy edited by G. V. Raynor. Jaswon's purpose is to convey the mathematical development of the theory of cohesion to readers who are already acquainted with the qualitative aspects of the subject. The first six chapters review the basic ideas of wave mechanics and their application to the study of the helium atom, the hydrogen molecule, and the theory of molecular orbitals. This provides the groundwork for the latter part of the book, in which the theory of metals, the application of the cellular approximation, and covalent structures are discussed.

Jaswon does not cover as wide a field as the title suggests. The illustrative ex-