Book Reviews

The Proteins. Chemistry, biological activity, and methods. vol. II, pt. B. Hans Neurath and Kenneth Bailey, Eds. Academic Press, New York, 1954. ix + 634 pp. Illus. + plates. $16.50.

Volume IIB of *The Proteins* concludes a treatise already indispensable to the protein chemist. It contains six chapters by seven American and British contributors including both editors. Whereas volume I covered general reactions and properties, and IIA specific group proteins, IIB is more concerned with molecular biology and biosynthesis. Plasma, muscle, and fibrous proteins are considered, with emphasis on structure and function. Amid heated controversy, great progress has resulted from recent study of muscle biochemistry, protein biosynthesis, and the polypeptide configurations of structural proteins. It is fortunate that such experienced investigators were chosen to evaluate the current status of these problems.

The book begins with a chapter on "interstitial" proteins by W. L. Hughes that is admittedly developed around the author's own interests. Despite the failure to include some significant new work, the article is a fine source of information on purified plasma proteins. W. C. Boyd follows with a thorough, coherent description of the proteins of immune reactions that is notable for its impartiality. Although research on antibody formation is omitted, the subject is later summarized by H. Tarver. J. C. Kendrew reviews fibrous proteins in an article replete with fine photographs and remarkable for lucid analysis of the theoretical structures proposed for keratins.

In an excellent introduction to a confused field, Bailey critically, yet objectively, discusses muscle proteins from a historical viewpoint and with emphasis on structure and function. N. M. Green and Neurath review proteolytic enzymes —particularly their action on proteins and the effects of inhibitors. The perceptive analysis of enzyme kinetics and of zymogen transformations is noteworthy. Tarver concludes the volume with a detailed but well-balanced interpretation of studies on peptide and protein synthesis and protein turnover.

Most authors cite many late references, and there is an excellent subject and author index for volumes IIA and IIB. In a treatise destined to become the standard reference work on proteins, this volume is outstanding for topical interest, homogeneity and balance in treatment, authoritative interpretation, and good style.

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Strength and Resistance of Metals. John M. Lessells. Wiley, New York; Chapman & Hall, London, 1954. xiv + 450 pp. Illus. $10.

This book is intended, primarily, to provide the advanced undergraduate and graduate student of machine design with information on the behavior of metals under stress. It is apparent that the choice of subject matter and the method of presentation have been dictated by the considerable practical engineering experience of the author, since the emphasis is on the factors that are most frequently encountered as the cause of service failure of machine elements and structural members. Although occasional reference is made to elements of physical metallurgy, the interpretation of mechanical behavior of metals is presented largely from the viewpoint of classical mechanics or applied elasticity. Most of the discussion centers on the behavior of steel, but reference is also made to light metals, heat-resisting alloys, and so forth, when the behavior of these metals differs greatly from that of steel.

Topics considered include the tension test and the mechanism of overstrain, in the first two chapters. Considerable attention is given to details of test equipment and to definitions of terms of engineering importance, such as elastic limit and proportional limit. Hysteresis effects and residual stresses are briefly reviewed in their relation to overstrain. In the first two chapters and throughout the book, great care is taken to point out the factors that are likely to be of importance to the design engineer.

The behavior of metals at elevated temperatures is discussed briefly in Chapter 3. Methods for utilizing, in design, the results of short-time tensile, stress rupture, and creep tests are also reviewed.

Chapter 4, on the subject of hardness testing, includes a discussion of the Meyer hardness analysis as well as a description of the more conventional techniques.

The subject of resistance to impact loading is considered in Chapter 5, and some discussion of the low temperature embrittlement effect is given from the viewpoint of its importance in engineering design.

Failure of metals by fatigue is presented in considerable detail in Chapters 6–8. The influence of such factors as temperature, size, surface condition, residual stress, and numerous other variables on fatigue strength is covered, and many examples taken from actual service failures are included.

Chapters 9 and 10 are devoted to the subjects of strain hysteresis and mechanical wear, respectively. The more important theories of strength, working stresses, and choice of safety factors are presented in the final chapter. Tables of the properties of metals and alloys in common use are included.

Throughout the text are many illustrative problems; additional problems dealing with the subject matter of each chapter are at the end of the book.

Those who are interested primarily in the reasons *why* particular metals behave as they do are unlikely to be satisfied with the treatment given. The practicing engineer and designer should find this a valuable reference. The author is to be commended for gathering into a single volume detailed information on a number of topics of great practical importance, which formerly was dispersed throughout the technical literature.

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Isotope Geology. Kalervo Rankama. McGraw-Hill, New York; Pergamon Press, London, 1955. xvi + 535 pp. Illus. $12.

Kalervo Rankama has coined the name "Isotope Geology" to express his ideas on the bearing of the nuclides on geology and their possible application to problems of geology. The book is divided into two parts: part I, "Physics and chemistry of nuclides," using some 148 pages, and part II, "Natural science of nuclides," with 277 pages. A bibliography uses 44 pages, with a name index of 7 pages. The subject index is very complete and uses 46

pages. Numerous equations are skillfully placed as needed in the text. It is not easy reading because of the complete documentation; although this documentation slows the reading, it adds to the book's value.

It may surprise some geologists to realize that Nier and Gulbransen applied mass spectrometry in 1939 when they determined the 12C/13C ratio in various geologic materials. Their use of isotopes in geologic investigations opened up an entirely unrecognized area of geology. Unfortunately only a few geologists have been watching the development of this most valuable and interesting field of research, and I have heard many comments on why physicists and chemists are determining the geologic age of this or that or the temperature of fossil seas and the like.

The 80 elements covered in part II clearly show the great possibilities of the use of isotopes as applied to geology. In some cases considerable use has been made of the isotopes with which most of us are familiar, as for example, helium in measuring geologic time; heavy water; carbon-14; the isotopes of lead and their geologic implications, and several other elements. But how many geologists have considered the possibilities of using xenon with its nine stable isotopes; ^{124}Xe, ^{126}Xe, ^{128}Xe, ^{129}Xe, ^{130}Xe, ^{131}Xe, ^{132}Xe, ^{134}Xe, and ^{136}Xe, or any of the artificially produced radioisotopes with mass numbers 125, 127, 131, 133, 135, 137, 138, 139, 140, 141, 143, 144, and 145?

Xenon can be used to measure the age of uranium minerals. The xenon method can be used to measure the age of the elements and gives 7.5×10^9 years as an approximate age for them. Of course, lead has been used extensively in determining the age of the earth, and it can also be used to correlate igneous rocks. Maybe we could use praseodymium isotope; if it gives a natural alpha activity and if it is radioactive, its half-life must be longer than 4×10^{15} years. The coverage in this book is surprising.

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Vitamins and Hormones. Advances in research and applications. vol. XII. Robert S. Harris, G. F. Marrian, and Kenneth V. Thimann, Eds. Academic Press, New York, 1954. xi + 305 pp. Illus. $7.50.

In the 12th volume of *Vitamins and Hormones,* only a limited number of topics, such as vitamin B_{12}, vitamin A, the estrogens and related substances in plants and their effects on domestic fowls, and disturbances in nutrition related to liver disease in man are included. Of particular interest is the inclusion of the chapter on light regulation of hormone secretion. Although this volume should be considered essential and useful to all who are interested in recent advances in the vitamins and hormones, the following comments seem to be pertinent.

The limitation of the topic under discussion is undoubtedly motivated by the desire of the editors to exclude certain newer developments that have not "reached a stage at which they can be profitably reviewed in a comprehensive and critical manner." For example, although the chemistry of vitamin B_{12} was brought up to date, the recent studies on physiological aspects of this nutrient, such as its mechanism of absorption or its indicated uses, were omitted. The chapters on "The intestinal synthesis of vitamins in the ruminant" and "Disturbances in nutrition relating to liver disease in man" are clear and brief. In the former chapter some readers might find it more rewarding if additional information on the various hypotheses regarding the mechanism of synthesis were included.

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General Chemistry. W. Norton Jones, Jr. Blakiston, New York, 1954 (Order from McGraw-Hill, New York). xii + 907 pp. Illus. $6.50.

Here is a book that is different. Many teachers will want to have a desk copy—they should, because they will profit either by adopting it or by absorbing some good ideas from it as a reference book.

The arrangement of topics is a radical change from the classical sequence. Atomic structure is presented early with a very complete treatment of periodic and structural relationships. Sodium is the first element discussed, then follow "Some chemical relationships of mass and energy," "Gases," "Chlorine," "Liquids," "Magnesium," "Solids," "Aluminum," "Solutions," and so forth, on to the "Inert gases" as Chapter 41 (the last). Hydrogen is discussed in Chapter 23, and oxygen in Chapter 25.

The treatment of each topic is modern and quite complete. The level certainly is pitched to classes of better students, even though the author says in the first sentence of the preface, ". . . the text is intended for use by students of first-year chemistry and is suitable for use by groups composed both of students who have had high school chemistry courses and those who have not."

The sequence of topics may be quite teachable. I cannot pass judgment on this point; usually the verity of this assumption is affirmed only by classroom use.

In general the writing is clear, the format is good, and the exercises and collateral readings are adequate. The only weakness that might be pinpointed is the lack of good illustrations at the beginning of the book—Chapters 1, 2, and 3.

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Perspectives and Horizons in Microbiology. A symposium. Selman A. Waksman, Ed. Rutgers Univ. Press, New Brunswick, N.J., 1955. x + 220 pp. Illus. + plates. $3.50.

In the 1930's the complaint was sometimes heard that those who studied bacteria were more interested in finding out what bacteria do than in knowing what they are. That the interests of bacteriologists have changed, and that microorganisms are now major objects of fundamental biological and biochemical study are facts that are amply illustrated by this publication.

The book contains the papers presented in a symposium held in connection with the dedication, in June 1954, of the Institute of Microbiology of Rutgers University. The far from modest title appears less pretentious when one learns that the authors of the 13 papers include some of the most brilliant minds in microbiology. The distinguished contributors are C. B. Van Niel (the microbe as a whole), A. Lwoff (some aspects of metapoietic integrations), J. Lederberg (genetics and microbiology), B. D. Davis (nutritional and enzymatic studies on microbial mutants), H. A. Barker (progress and problems in bacterial metabolism), J. W. Foster (molds as metabolic models), W. W. Umbreit (metabolic pathways), P. Wilson (pathways in biological nitrogen fixation), D. H. Peterson (microorganisms and steroid transformations), M. Heidelberger (some unsolved problems in immunology), F. L. Horsfall, Jr. (inhibition of virus reproduction by chemical substances), H. Eagle (challenging problems in antibiotic research), and R. L. Starkey (microorganisms and plant life). An appendix contains addresses by L. W. Jones, S. A. Waksman, and A. J. Kluyver [see *The Scientific Monthly* **79**, 353 (1954)].

As must be unavoidable in a symposium so broad in scope, the individual contributions vary greatly in the character of the subject matter treated as well as in style and method of presentation. For these reasons there is a notable lack of coherence in spite of an attempt to