

Instead of this, Fujita's expression for θ_* at $\alpha = 0$, was used: namely

$$\theta_* = \frac{1}{y_*(1+m-my_*)} \quad (2)$$

On substitution of (2) in (1) and integration, the result is

$$\tau = \frac{1}{1+m} \left\{ 1 + \frac{2m\alpha}{(1+m)^2} \right\} \ln \left(\frac{y_*}{1+m-my_*} \right) + \frac{\alpha}{(1+m)^2} \left\{ 1 - m - \frac{1+m-2my_*}{(1+m-my_*)y_*} \right\} \quad (3)$$

The agreement for $\alpha = 1.0$, $m = 0.5$ is shown in the table.

y_*	τ by		
	Computer solution	Equation (3)	Oth-Desreux
1.0406	0.08000	0.08002	0.07959
1.0823	.16000	.15996	.15835

1.1250	.24000	.23977	.23622
1.1687	.32000	.31960	.31318
1.2132	.40000	.39927	.38918
1.2584	.48000	.47878	.46420
1.3042	.56000	.55816	.53819
1.3503	.64000	.63711	.61111
1.3968	.72000	.71602	.68294
1.4433	.80000	.79443	.75363

For lower values of α and m agreement is even better, for example, at $m = 0.1$, $\alpha = 1.0$, $\tau = 0.79889$ vs. 0.8000 at $y = 1.5298$; at $m = 0.1$, $\alpha = 0.2$, the two values of τ differ by 2.5 parts in 10,000 at $y = 1.4938$. As would be expected, a very good approximation always is obtained for y close to unity.

SHELL DEVELOPMENT COMPANY
EMERYVILLE, CALIFORNIA

M. WALES

RECEIVED JUNE 25, 1959

BOOK REVIEWS

The Chemical Behavior of Zirconium. By WARREN B. BLUMENTHAL, Chief of Chemical Research, Titanium Alloy Manufacturing Division, National Lead Company, Niagara Falls, New York. D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, N. J. 1958. vi + 398 pp. 15.5 × 23.5 cm. Price, \$11.00.

This volume is offered "with the intent of providing students and research workers with a broad and detailed account of the chemistry of zirconium as an element and as a component of compounds, interstitial solutions, and alloys." To this end, the author has summarized the available information on zirconium chemistry in a monograph which far exceeds in comprehensiveness and scope any previously published treatise on this element. In doing this, he has avoided the purely encyclopedic approach by the liberal interpolation of interpretative comments and semi-theoretical concepts.

The book treats in order background chemistry, the element, the important interstitial and intermetallic phases, the simple compounds, and the complex compounds. Each section is liberally documented with original literature citations. Illustrations, except for phase diagrams, are at a minimum, but the text is replete with graphic formulations of various compounds and ionic species.

As a source of information about zirconium chemistry, the volume is highly recommended. As an interpretative treatment, however, the book cannot be as highly recommended. The theoretical and semi-theoretical portions are definitely weaker than the descriptive and are commonly more speculative than definitive. Thus, much of what is given as structural material has no support in experimental fact; many explanations are circuitously worded and couched in such general terms as to be without real meaning; and more attention is sometimes paid to the "rules" of zirconium chemistry than the available evidence would warrant. Typical is the comment on p. 37: "Although zirconium occurs both in cations and anions, it is incorrect to associate the positive charge of zirconium-containing cations with the zirconium atom. It is rather to be associated with the oxygen atom."

Mechanically, the book is well done and attractive. Errors in printing and proof reading are at a minimum. An excellent author index is provided. The subject index, however, is much too brief and non-inclusive to do the volume justice.

NOYES CHEMICAL LABORATORY
UNIVERSITY OF ILLINOIS
URBANA, ILLINOIS

THERALD MOELLER

Vitamins and Hormones. Advances in Research and Applications. Volume XVI. Edited by ROBERT S. HARRIS, Professor of Biochemistry and Nutrition, Massachusetts Institute of Technology, Cambridge, Massachusetts, G. F. MARRIAN, Professor of Medical Chemistry, University of Edinburgh, Edinburgh, Scotland, and KENNETH V. THIMANN, Professor of Biology, Harvard University, Cambridge, Massachusetts. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. xi + 437 pp. 16 × 23.5 cm. Price, \$11.60.

Volume XVI of "Vitamins and Hormones" is a book which covers nine separate subjects of great current interest. Each chapter is an authoritative account of the present stage of development of the particular subject and written so that it is of interest to the uninformed as well as to the expert in the field. The literature references are particularly valuable in most of the chapters because they have been gathered from such a wide variety of sources.

Three chapters, "Nutritional Effects of Parasitic Infections and Disease," "The Dependence of Gonadal Function upon Vitamins and Other Nutritional Factors" and "Vitamins and Other Nutrients in Cardiovascular Disease," deal principally with nutrition and physiology. Three of the chapters, "Chemical Structure in Relation to Biological Activities of Vitamin B₆," "Glucagon" and "Synthetic Derivatives of Cortical Hormones" are largely chemical in nature. The remaining three, "Hormonal Aspects of Coronary Artery Disease," "The Physiology of Secretin" and "Chemistry and Physiology of the Thyroid-Stimulating Hormone," deal mostly with physiological and biological aspects.

For many years it has been realized that diet had a considerable influence on parasitism and disease, but the interdependence of host and parasite nutrition has been too complex and variable to permit any generalization. The chapter by Geiman indicates that progress has been made because of a better understanding of the metabolism of both host and parasite. No simplification of the problem has yet resulted from this progress.

A similar evaluation could be made of the relation of nutrition and gonadal function covered by Lutwak-Mann. A number of pertinent questions are asked at the beginning of the chapter. It presents many data bearing on the questions, but in most cases these are not yet adequate for definite answers.

The same is true for the relation of nutrients and cardiovascular disease. In the opinion of the authors of this chapter, Felch, Sinisterra, Itallie and Stare, the theory of hyper-

cholesteremia has not been proved to be one of cause and effect or that fatty acid "imbalance" results in hypercholesteremia. Evidence linking the nature of the fat or total fat intake to atherosclerosis is inadequate.

The chapter by Snell dealing with vitamin B₆ is a fascinating chapter in part because so much is now known about the chemistry and biology of these coenzymes. An over-all picture is presented which certainly will have to be considered in any general theory of enzyme action. The story of glucagon, by Behrens and Bromer, is an account of only a few years brilliant chemical work and reflects the progress so recently made in the protein field. With so much of the chemistry of this hormone now understood, it is strange that a clearer understanding of its physiological role has not been forthcoming. The chapter by Fried and Borman brings together a mass of information useful for many reasons. Like the chapter on vitamin B₆, it shows how specific structural details often must be to bring about a desired physiological response.

Although secretin is the active principle for which the term "Hormone" was first used, progress in the study of its chemistry has been slow. The recent report of Newton, Love, Heatley and Abraham (*Biochem. J.*, 6 P (1959)) of the separation of it into three active principles by countercurrent distribution indicates that rapid progress will now be made. It is not yet certain whether thyroid-stimulating hormone is a single substance or not. The complicated state of advancement with thyroid-stimulating hormone is well treated by Sonenberg and the same may be said of the chapter by Oliver and Boyd on the relation of hormones to coronary disease.

The book is a thoroughly stimulating one for anyone interested in biochemistry.

THE ROCKEFELLER INSTITUTE
NEW YORK 21, NEW YORK

LYMAN C. CRAIG

BOOKS RECEIVED

July 10, 1959–August 10, 1959

- WESLEY E. BRITTIN AND LITA G. DUNHAM, Edited by. "Lectures in Theoretical Physics." Volume I. "Lectures Delivered at the Summer Institute for Theoretical Physics, University of Colorado, Boulder, 1958." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. 414 pp. \$6.00.
- STANLEY CHABEREK AND ARTHUR E. MARTELL. "Organic Sequestering Agents. A Discussion of the Chemical Behavior and Applications of Metal Chelate Compound, in Aqueous Systems." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. 616 pp. \$25.00.
- THE COMBUSTION INSTITUTE. "Seventh Symposium (International) on Combustion. At London and Oxford, 28 August–3 September, 1958." Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. 959 pp. \$35.00.
- GEORGE E. CONDOYANNIS. "Scientific Russian. A Concise Description of the Structural Elements of Scientific and Technical Russian." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. 225 pp. \$3.50.
- G. MALCOLM DYSON. "A Short Guide to Chemical Literature." Second Edition. Longmans, Green and Co., Inc., 119 West 40th Street, New York 18, N. Y. 1958. 157 pp. \$3.25.
- LOUIS F. FIESER AND MARY FIESER. "Steroids." Reinhold Publishing Corporation, 430 Park Avenue, New York 22, N. Y. 1959. 945 pp. \$18.00.
- F. HELFFERICH. "Ionenaustauscher." Band I. "Grundlagen. Struktur. Herstellung. Theorie." Verlag Chemie, G.m.b.H., Pappelallee 3, Weinheim/Bergstr., Germany. 1959. 520 pp. DM 48.—.
- HERBERT M. HERSHENSON. "Infrared Absorption Spectra. Index for 1945–1957." Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. 111 pp. \$7.00.
- T. P. HOAR, Editor. "International Committee of Electrochemical Thermodynamics and Kinetics (C.I.T.C.E.). Proceedings of the Ninth Meeting. Paris, 1957." Butterworth and Co. (Canada) Ltd., 1367 Danforth Avenue, Toronto 6, Ontario, Canada. 1959. 489 pp. \$24.00.
- JAMES M. JACOBS, Compiled by. "Reprocessing of Irradiated Fission Reactor Fuel and Breeding Materials. An Annotated Bibliography of Selected Report Literature." Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. 1958. 118 pp. \$2.75.
- W. P. JORISSEN. "Induced Oxidation." D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1959. 208 pp. \$8.75.
- J. MURRAY LUCK, Editor, FRANK W. ALLEN, Associate Editor, AND GORDON MACKINNEY, Associate Editor. "Annual Review of Biochemistry." Volume 28. Annual Reviews, Inc., Grant Avenue, Palo Alto, California. 1959. 698 pp. \$7.00 (U.S.A.); \$7.50 (elsewhere).
- EUGEN MÜLLER, Edited by. With O. BAYER, H. MEERWEIN, AND K. ZIEGLER. "Methoden der Organischen Chemie (Houben-Weyl)." Vierte, Völlig Neu Gestaltete Auflage. Band I. "Allgemeine Laboratoriumspraxis." Teil 2. Georg Thieme Verlag, Herdweg 63, Stuttgart, Germany. 1959. 1017 pp. \$46.65; subscription price, \$42.00.
- R. A. ROBINSON AND R. H. STOKES. "Electrolyte Solutions. The Measurement and Interpretation of Conductance, Chemical Potential and Diffusion in Solutions of Simple Electrolytes." Second Edition. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. 559 pp. \$11.50.
- E. H. RODD, Edited by. "Chemistry of Carbon Compounds." Volume IV, Part B. "Heterocyclic Compounds." D. Van Nostrand Company, Inc., 120 Alexander Street, Princeton, New Jersey. 1959. 654 pp. \$24.00.
- E. SEGRÉ, Editor. "Experimental Nuclear Physics." Volume III. John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1959. 811 pp. \$23.00.
- FREDERICK SBITZ AND DAVID TURNBULL, Editors. "Solid State Physics." Volume 7. "Advances in Research and Applications." Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1958. 525 pp. \$12.00.
- ROBERT L. SMITH. "The Sequestration of Metals. Theoretical Considerations and Practical Applications." The Macmillan Company, 60 Fifth Avenue, New York 11, N. Y. 1959. 256 pp. \$8.50.
- EDWIN M. SMOLIN AND LORENCE RAPOPORT. ARNOLD WEISSBERGER, Consulting Editor. "The Chemistry of Heterocyclic Compounds." Volume XIII. "s-Triazines and Derivatives." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. 644 pp. \$30.00. Subscription Price, \$28.00.
- OSTAP STASIW. "Struktur und Eigenschaften der Materie in Einzeldarstellungen." Band XXII. "Elektronen- und Ionenprozesse in Ionenkristallen mit Berücksichtigung Photochemischer Prozesse." Springer-Verlag, Heidelbergberger Platz 3, Berlin-Wilmersdorf, Germany. 1959. 307 pp. DM. 66.—.