
BOOK REVIEWS

Theoretische Biochemie. Physikalisch-Chemische Grundlagen der Lebensvorgänge. By HANS NETTER, O. O. Professor der Physiologischen Chemie an der Universität Kiel. Springer-Verlag, Heidelberger Platz 3, Berlin-Wilmersdorf, Germany. 1959. ix + 816 pp. 18 × 25.5 cm. Price, DM. 88.—

For American readers a more revealing title of Professor Netter's book might be "biophysical chemistry," since its general structure is the development, followed by the application, of various topics in physical chemistry to problems of current interest in physiology. *Complete* success in writing such a book is scarcely to be expected; here and there a critic can prove that in certain instances the physical chemistry presentation is so brief as to be superficial, or that the biological context and significance is lost amongst simplifications and approximations, or that the biological topics chosen for analysis are neither the most significant nor timely. On the whole, however, Netter has achieved an *admirable* compromise between rigor, readability and length. Moreover, besides very adequate treatments of such standard topics as diffusion, thermochemistry, ionization equilibrium, etc., he has provided valuable accounts of topics rarely discussed in general books. Among these latter are distribution of materials in tissues, surface phenomena at cell membranes, thermodynamics of metabolism, and trans-membrane transport. Generally speaking, this reviewer found thermodynamics-based discussions to be excellent, and consideration of molecular models to be somewhat skimpy. If purchased soon enough (the obsolescence rate in this field is frightening), Netter's book will be especially valuable, (a) to research workers in biophysical chemistry as a reference book for subjects outside of their immediate specialty, and (b) to physics, chemistry and (well-trained) physiology majors undertaking a rigorous course in academic (non-medical) biochemistry. This reviewer would be satisfied with something less than Springer's typographical splendor if it were sensibly-priced; a cheap paper-bound English translation of Netter's book would be a significant contribution to current American biochemistry.

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Introduction to Quantum Mechanics. By CHALMERS W. SHERWIN, University of Illinois. Henry Holt and Company, 383 Madison Avenue, New York 17, N. Y. 1959. xii + 385 pp. 17 × 24.5 cm. Price, \$7.50.

Professor Sherwin's text is designed for students who have had a comprehensive basic course in physics and mathematics through the calculus; some knowledge of differential equations, orthogonal functions and complex variables is required, though these topics could be developed by the instructor or acquired in parallel mathematics courses. In short, the text could be used in the junior year of a university physics curriculum and in the senior year in most collegiate programs.

The first chapter describes the Experimental Basis of Quantum Mechanics in only seven pages of text. The second chapter is devoted to an exposition of the Basic Postulates of quantum mechanics in fifteen pages. The rest of the book is devoted to elaboration of the basic postulates and development of accessory notions through application to simple systems. The point of this exposition is to generate understanding of wave functions and the uses to which they can be put, by solution of simple problems in exact fashion rather than by the approximate solution of problems related to complex systems.

The next four chapters deal with: The Solution of the Wave Equation; The Wave Equation in Three Dimensions; The Superposition of States, and Some Calculations Using the Wave Function; and, Angular Momentum. One hundred and twelve pages of text are devoted to these chapters; in them, emphasis is placed upon numerical solutions of the

Schrodinger equation, though the analytic solutions are given.

Another four-chapter group follows: Steady-State Perturbation Theory. Nondegenerate Case; Steady-State Perturbation Theory. Degenerate Case; Identical Particles; Time-Dependent Perturbation Theory. About a hundred pages of text are devoted to this material.

The last chapter, fifty-two pages, is titled: The Relativistic Wave Equation and the Origin of Electron Spin; the necessary matrix methods are introduced as part of the exposition.

This is an excellent book. Sherwin has a nice facility for the selection of simple examples and analogies and these are scattered throughout the text. The emphasis on numerical rather than analytic methods tends constantly to bring home to the student the fact that quantum mechanics works, and he is reminded often that any but the very simplest problems may require approximations. The numerous problems appended to each chapter have a ring of originality and the collection undoubtedly will be "mined" by other authors.

Of course, since approximation methods are played-down, only the seeds of the treatment of chemical binding are sown in the text. If this book were to be used in an advanced physical chemistry course, the instructor would have to supplement it by lectures and problems on the application of quantum mechanics to systems of chemical interest; the text adheres quite closely to the author's aim of demonstrating the fundamentals, period. Perhaps this is the way texts ought to be written if the lecture system is to have a *raison d'être*.

Mechanically, the book is well produced; the type and composition are pleasing to the eye, the paper does not insult it, and the binding will stand more than ordinary use. One minor point—the use of light-face sans-serif type to number the equations is incongruous. There appear to be very few typographical errors, except in the last chapter, which is loaded with them to the extent that in some sections there just is no correspondence between text and display formulas. Otherwise, the book is both handsome and carefully constructed.

For the students he had in mind, the author achieves his purposes. The book is admirably suited for review in light of a different viewpoint by more experienced students.

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Advances in Spectroscopy. Volume I. Edited by H. W. THOMPSON, C.B.E., F.R.S., St. John's College, Oxford. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1959. ix + 363 pp. 16 × 23.5 cm. Price, \$12.50.

This volume is the first of a series in which various aspects of spectroscopy are to be reviewed. The present volume contains eight articles, written by experts who have made substantial contributions to their subject. The articles vary in length, are authoritative, and contain much instrumental, experimental and interpretative detail. Many are illustrated by photographs of apparatus and of spectra, drawings and tables of data. The individual articles are well documented, and the volume is supplied with the usual indices. No attempt is made to correlate the individual articles. A list of articles and authors follows: The Spectra of Polyatomic Free Radicals, D. A. Ramsay; Spectroscopy in the Vacuum Ultra-violet, W. C. Price; The Index of Refraction of Air, D. H. Rank; Determination of the Velocity of Light, D. H. Rank; High Resolution Raman Spectroscopy, B. P. Stoicheff; Modern Infra-red Detectors, T. S. Moss; The Infra-red Spectra of Polymers, A. Elliott; Rotational Isomerism about C-C Bonds in Saturated Molecules as Studied by Vibrational Spectroscopy, N. Sheppard.

This and subsequent volumes of the series should furnish valuable ready reference for research workers in areas allied with spectroscopy. They will obtain a clear idea of the pres-

ent state of specific areas of spectroscopic research and of possibilities of further development. The reviews should be equally valuable to the spectroscopist who has become somewhat overspecialized, and is unaware of important developments in his own field.

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Advances in Catalysis and Related Subjects. Volume XI. Edited by D. D. ELEY, Nottingham, England, P. W. SELWOOD, Evanston, Illinois, and PAUL B. WEISZ, Paulsboro, N. J. Academic Press, Inc., 111 Fifth Avenue, New York 3, N. Y. 1959. x + 384 pp. 16 × 23.5 cm. Price, \$12.50.

The Editors of this Series again have made available an interesting and useful collection of critical reviews concerning several aspects of catalytic phenomena. Titles of individual contributions, and the authors are:

I. The Kinetics of the Stereospecific Polymerisation of α -Olefins. By G. Natta and I. Pasquon (Milan).

II. Surface Potentials and Adsorption Process on Metals. By R. V. Culver (University of Adelaide) and F. C. Tompkins (London).

III. Gas Reactions of Carbon. By P. L. Walker, Jr., F. Rusinko, Jr., and L. G. Austin (The Pennsylvania State University).

IV. The Catalytic Exchange of Hydrocarbons with Deuterium. By C. Kemball (The Queen's University of Belfast).

V. Immersional Heats and the Nature of Solid Surfaces. By J. J. Chessick and A. C. Zettlenoyer (Lehigh University).

VI. The Catalytic Activation of Hydrogen in Homogeneous, Heterogeneous, and Biological Systems. By J. Halpern (University of British Columbia).

All 6 reviews will be of interest to students of catalysis. Especially to be commended to the general reader's attention are the first of these, which is primarily a comprehensive statement of results and conclusions emanating from the laboratories of a pioneer in the investigation of stereospecific polymerisation; and the last, which draws particular attention to the activation of hydrogen by ions in aqueous solution, and to the broad range of conditions under which hydrogen-deuterium exchange, *ortho-para* hydrogen conversion, and catalytic hydrogenation can be accomplished.

The Editors wisely avoid comprehensive coverage of the field in any one volume of the Series. Nevertheless, the eleven volumes now available come close to attaining this goal.

A general index in some future volume would add substantially to the usefulness of the Series as a whole.

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ROBERT N. PEASE

Progress in the Chemistry of Organic Natural Products. Volume XVII. Edited by L. ZECHMEISTER, California Institute of Technology, Pasadena. Springer-Verlag, Mölkerbastei 5, Wien I, Austria. 1959. x + 515 pp. 16.5 × 23.5 cm. Price, \$18.65; Ganzleinen, \$19.80.

In his latest offering, L. Zechmeister serves up a wide variety of courses, which—as is often the case with a pot-luck—include both warmed-over hash and more satisfying, substantial main dishes, as well as a few uncommon specialties. Volume XVII belongs in every chemistry library; it is recommended to individuals interested in broadening their knowledge of natural product chemistry, as well as to those with active interests in the topics listed below. The chapters "Flavones and Isoflavones," "Neuere Ergebnisse der Chemie pflanzlicher Bitterstoffe," "Alkaloide aus Calebassencurare und südamerikanischen Strychnosarten," and "The Chemical Structure of the Normal Human Hemoglobins" are authoritative, well-written, complete and up-

to-date. Although "Fortschritte der Chemie der Vitamine D und ihrer Abkömmlinge" is competently handled, the complete omission of Lythgoe's contribution in this area is glaring (this incident suggests the need for a refereeing system in this series). "Some Biochemical Aspects of Disease in Plants" and "Paleobiochemistry and Organic Geochemistry" are a bit thin chemically (in the former chapter, incorrect structures for lycorin and gibberellic acid are reproduced), but on the other hand they direct attention to rich areas of research for the organic or biochemist capable of operating in those fields. Although "Occurrence and Metabolism of Simple Indoles in Plants" is seemingly complete, the chapter is marred by occasional unhappy expressions: for example, "The compound isolation of this is not reported from any other plant" (p. 260) appears as a careless transposition, and "An inconclusive report from a fungus has also been made" (p. 252) unintentionally suggests intellectual prowess normally lacking at this lower life level. "The Electron Gas Theory of the Color of Natural and Artificial Dyes: Applications and Extensions," while original and provocative, has in fact little to do with natural product chemistry.

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Progress in Microchemistry. *Microchemical Journal*. Volume III. Issue 3. Edited by NICHOLAS D. CHERONIS. Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. August, 1959. pp. 271-475. 15 × 23 cm. Price, \$4.00; Annual Subscription Price, \$16.00.

This is the "Annual Progress Issue" of the *Microchemical Journal*. The subject of microchemistry has been divided into twelve subdivisions and work in each of these twelve areas has been reviewed by separate authors. Comprehensive and critical evaluations are supplemented by a listing of all of the papers which were considered in the compilation of this progress report. One cannot fail to be impressed by the vigorous growth of microchemistry and by the use of micro methods all along the frontiers as well as for the performance of the everyday tasks of chemistry.

The Table of Contents, which follows, is sufficiently descriptive to indicate the areas covered in this annual progress issue.

(1) J. H. Badley and F. H. Stross: Progress in Reduced Scale Determination of Physical Constants: 1958.

(2) John Krc, Jr.: Progress in Chemical Microscopy: 1958.

(3) A. G. Mistretta: Progress in Fractionation Procedures. I. Differential Migration Methods: 1958.

(4) Milton T. Bush: Progress in Fractionation Procedures. II. Distillation, Sublimation and Crystallization: 1958.

(5) A. A. Benedetti-Pichler: Progress in Qualitative Inorganic Analysis: 1958.

(6) Robert Maurmeyer: Progress in Quantitative Inorganic Analysis: 1958.

(7) Samuel Natelson: Progress in Biochemical Investigations: 1958.

(8) A. Steyermark: Progress in Elemental Quantitative Organic Analysis: 1958.

(9) T. S. Ma: Progress in Functional Group Quantitative Organic Analysis: 1958.

(10) Nicholas D. Cheronis: Progress in Qualitative Organic Analysis: 1958.

(11) A. R. Ronzio: Progress in Organic and Inorganic Microsynthesis: 1958.

(12) Howard J. Francis, Jr.: Progress in Equipment and Tools: 1958.

Chemists interested in microanalytical procedures or the manipulation of small amounts of material will find it profitable to examine this number of the "Microchemical Journal." The collection and classification of references is a distinct service.

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