

substantial enrichment of both zinc and activity was encountered in the first crystalline fraction. Throughout the fractionation alkaline earth and transition elements decreased to absolutely, and stoichiometrically, negligible quantities.

Inhibition of enzymatic activity by typical metal chelating agents such as O-phenanthroline was observed, and, correlating to this, the agent was capable of removing zinc from the protein, which could not be accomplished by dialysis against water or ammonia. The protein satisfies the criteria of a zinc metalloprotein.⁷

These data expand on previous observations and conjectures concerning the enzymatic character-

(7) B. L. Vallee, F. L. Hoch and W. L. Hughes, *Archiv. Biochem. Biophys.*, **48**, 347 (1954).

istics of carboxypeptidase and its possible metal content.⁸ A full account of this work will be published elsewhere.

These studies were aided in part by a contract between the Office of Naval Research, Department of the Navy, and Harvard University, Contract No. Nr5ori-07660.

(8) H. Neurath and G. de Maria, *J. Biol. Chem.*, **186**, 653 (1950).

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RECEIVED AUGUST 11, 1954

BOOK REVIEWS

Catalysis. Volume I. Edited by PAUL H. EMMETT, Gulf Research and Development Company's Multiple Fellowship, Mellon Institute, Pittsburgh, Pennsylvania. Contributing Authors are HERMAN E. RIES, JR., PAUL H. EMMETT, KEITH J. LAIDLER, W. B. INNES, F. G. CIAPETTA C. J. PLANK, and P. W. SELWOOD. Reinhold Publishing Corporation, 330 W. 42nd Street, New York 36, N. Y. 1954. vi + 394 pp. 16 × 23.5 cm. \$10.00.

During World War I, Rideal and the writer wrote a text entitled "Catalysis in Theory and Practice." There was a good deal of descriptive chemical technology and very little theory or science. That has all changed and the subject of catalysis now requires two volumes "to cover all the general approaches and tools" necessary to obtain a basic understanding of catalysis. An unspecified number of subsequent volumes will cover principles and mechanisms in individual catalytic reactions. The Editor selected for the task is a guarantee of a careful, thorough and competent coverage of the vast field. The present Volume I is at once a confirmation of this view and builds up one's expectancy for the volumes to follow.

In the order of the contributing authors listed above the topics covered in Volume I are Physical Adsorption; Surface Area; Chemisorption, Kinetic Laws, and Absolute Rates (3 chapters by Laidler); Catalyst Carriers, Promoters, Accelerators, Poisons and Inhibitors; Catalyst Preparation; Magnetism and Catalysis.

It is a striking feature of this field of work that new developments succeed each other with such speed that chapters in a book need additions even before publication. This is exemplified in the chapter on physical adsorption where new work by W. R. Smith, Beebe, Halsey and others in the last year has further illuminated the factors operative in the structure of the adsorption isotherms, and the role of the surface and its uniformity in the process. The data on chemisorption are excellently presented but again, in this case, newer data are beginning to suggest variations from the point of view presented. It is certain that the subject is actually more complex than the presentation of Laidler would suggest. The induced heterogeneity of even a uniform surface which is produced by chemisorption indicates that in calculating the absolute rates of surface reactions, the concept of concentration of sites cannot be the only parameter. The technical excellence of the book is admirably exemplified in Innes' chapter on carriers, promoters, etc. Throughout the book there is a wealth of tabular information. The chapter on catalyst preparation gives comprehensive literature references as well as important experimental

examples. The final chapter on magnetism by Selwood gives an authoritative outline of theory and well-chosen examples of applications of magnetism to the identification of catalyst components, reactions in the solid state with appropriate exemplification of experimental methods.

Volume I of the new text on catalysis is a heartening record of the progress that has been achieved in the science of catalysis during the last three decades and an indispensable base from which to proceed to chart the unknown future in the field.

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HUGH TAYLOR

Advances in Protein Chemistry. Vol. VIII. Edited by M. L. ANSON, Lever Brothers Company Research Center, Edgewater, New Jersey, KENNETH BAILEY, University of Cambridge, Cambridge, England, and JOHN T. EDSALL, Harvard Medical School, Boston, Massachusetts. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1953. ix + 529 pp. 16 × 23.5 cm. Price, \$10.50.

The eighth volume of "Advances in Protein Chemistry" maintains the high standards set by the preceding volumes in this series. It will undoubtedly find its way to every protein chemist's bookshelf. As in previous years, the reviews, of which there are seven, are authoritative, comprehensive and unhurried. One has the feeling that the authors have not been required to limit themselves to any given number of pages.

As usual, the interests of all varieties of protein chemists are represented. The articles range from "Rotational Brownian Motion and Polarization of the Fluorescence of Solutions" by G. Weber, a review distinguished by detailed mathematical derivation of pertinent equations, to "Peanut Protein, Isolation, Composition and Properties" by J. C. Arthur, Jr., a review emphasizing earthy facts, such as U. S. production figures for peanut butter (about 5 lb. per person per year, a figure well below the rate of consumption by the younger members of this reviewer's household).

The other articles are: "Naturally Occurring Peptides" by E. Bricas and C. Fromageot (with 667 references); "Peptide Bond Formation" by H. Borsook; "Bacteriophages: Nature and Reproduction" by F. W. Putnam; "Assimilation of Amino Acids by Gram-Positive Bacteria and Some

Action of Antibiotics Thereon" by E. F. Gale; and "Zone Electrophoresis" by A. Tiselius and P. Flodin.

It is probably unfair to pick out any of these as outstanding. However, this reviewer was especially delighted by Borsook's paper because of the firm thermodynamic foundation on which it is based. It is not often that one finds such unapproachable use of thermodynamics in the discussion of purely biochemical subjects. Also worthy of special mention is Putnam's review of the bacteriophages. The fascinating story of these viruses is one that every chemist should read.

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CHARLES TANFORD

Nuclear Radiation Physics. By RALPH E. LAPP, Ph.D., Nuclear Science Service, Washington, D. C., and HOWARD L. ANDREWS, Ph.D., National Institutes of Health, Bethesda, Maryland. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. 1954. x + 532 pp. 15.5 X 22 cm. \$6.75. Second Edition.

This work consists of 17 chapters (Particles and Waves, Atomic Structure, Isotopes and Nuclear Structure, Natural Radioactivity, X-Rays and γ -Rays, α -Particles, β -Particles, Ionization-Chamber Instruments, Pulse Counters, Particle Accelerators, Induced Nuclear Transformations, Neutron Physics, Nuclear Fission, Nuclear Power, Radiation-Measurement Technique, Radioactive Tracer Techniques, Radiation Health Protection) and a six part appendix (Physical Constants and Useful Data, Conversion Table for Units of Energy, Electron Velocities and Masses for Various Energies, Mass-Absorption Coefficients for Photons, Characteristics of Common Shielding Materials, A List of Radioisotopes). The title is thus no clue to the richness of the material between the covers, barely half the text being devoted to the physics of nuclear radiations.

The chapter organization is good. The text is interspersed with numerous graphs, tables and photographs, worked-out examples of calculations, and, happily, a considerable number of references to the original literature. Each chapter ends with a good sized set of problems, some with answers appended, and a list of collateral texts and references. From the breadth of the topics covered, it is obvious that no one receives exhaustive treatment. The presentation is well balanced, the exposition clear and generally free of gobbledygook.

The copy furnished the reviewer is well manufactured. The format is pleasant to the eye, though the hyper-gloss of the paper definitely is not, at least after reading 30 or 40 pages. There seem to be relatively few typographical errors.

This book will be of use to almost anyone interested in nuclear science, be he chemist, physicist, biologist or engineer. It could be employed with profit in a senior-graduate level course in which the instructor was prepared to present additional material on applications and methodology of interest to the particular group, provided only an introductory exposition of principles was desired.

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BOOKS RECEIVED

August 10, 1954–September 10, 1954

L. J. BELLAMY. "The Infra-red Spectra of Complex Molecules." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 1954. 323 pp. \$7.00.

FRIEDRICH CRAMER. "Paper Chromatography." Second revised and enlarged edition. Translated by Leighton Richards. St. Martin's Press, Inc., 103 Park Avenue, New York 17, N. Y. 1954. 124 pp. \$5.00.

WOLFGANG FINKELNBURG. "Einführung in die Atomphysik." Springer-Verlag, Reichpietschufer 20, Berlin W 35, Germany. 1954. 543 pp. Ladenpreis: Ganzeleinen DM 44,—.

DAVID M. GREENBERG (edited by). "Chemical Pathways of Metabolism." Volume II. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. 1954. 383 pp. \$9.50.

EMIL J. GUMBEL. "Statistical Theory of Extreme Values and Some Practical Applications." National Bureau of Standards. For Sale by the Superintendent of Documents U. S. Government Printing Office, Washington 25, D. C. 1954. 51 pp. \$1.40.

J. A. RADLEY. "Starch and Its Derivatives." Volume I. Third Edition (revised). John Wiley and Sons, Inc., 44 Fourth Avenue, New York 16, N. Y. 1954. 510 pp. \$10.00.

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A. J. RUTGERS. "Physical Chemistry." Interscience Publishers Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 804 pp. \$8.50.

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A. J. C. WILSON, General Editor, N. C. BAENZIGER, J. M. BIJVOET, AND J. MONTEATH ROBERTSON, Section Editors. "Structure Reports for 1950." Volume 13. N. V. A. Oosthoek's Uitgevers Mij., Domstraat 1-3, Utrecht, Holland. 1954. 643 pp. 80.—Dutch florins.

R. W. G. WYCKOFF. "Crystal Structures, Index to Organic Compounds." Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, N. Y. 1954. 33 pp.