NEW BOOKS

An Outline of Organic Nitrogen Compounds. By Ed. F. Degering, Department of Chemistry, Purdue University, and Collaborators. University Lithoprinters, Ypsilanti, Michigan, 1945. vi + 752 pp. 15 × 23 cm. Price, $7.50.

This work is a presentation of the chemistry of the more important nitrogen compounds in outline form. There are forty-five chapters, many of which did not appear in the earlier work of the same title which appeared in 1942. According to the authors, data which have appeared since 1926 "have been obtained, in general, from primary sources." Material which appeared prior to 1927 has been taken from secondary sources.

The Table of Contents comprises: Out of the Past, General Concepts, The Fixation of Nitrogen, The Ammonia System of Compounds, The Nitroalkanes or Nitroparaffins, The Polynitroalkanes, The Nitroalkenes, The Halonitroalkanes, The Nitrohydroxyalkanes, The Nitrosoalkanes, Aromatic Nitro Compounds, Nitroso Compounds, The Oximes, The Aliphatic Amines, The Amino Acids, The Polypeptides, The Proteins, The Diazenes, Hydrazoic Acid and the Triazenes, The Aromatic Amines, The Alkanolamines, Aromatic Diazo and Diazonium Compounds, The Azoxy Compounds, Hydrazines and Some Derivatives, The Aliphatic Amines, Urea, Some Derivatives of Urea, Thiourea, Guanidine and Some Derivatives, Derivatives of Sulfamic Acid and Sulfamide, Aryl Amides and Imides, The Aliphatic Nitriles, The Carbylamines, Cyanogen and Related Compounds, Aromatic Nitriles or Aryl Cyanides, Isocyanates, Thiocyanates and Isothiocyanates, Organic Nitrogen Dyes, The Alkaloids, Other Medicinals Which Contain Nitrogen, Vitamins of Nitrogen Content, High Polymers of Nitrogen Content, Pyridine and Quinoline, Syntheses of Nitrogen Ring Compounds, Some Miscellaneous Nitrogen Compounds, Explosives, and Isomerism of Organic Nitrogen Compounds.

Each chapter is subdivided into sections on: (1) history, occurrence, structure, uses, etc.; (2) nomenclature; (3) methods of preparation; (4) physical properties; (5) reactions. References appear at the ends of the chapters, and the pages on which the references appear are noted at the bottoms of the right-hand pages throughout the chapters.

In order to accommodate the mass of data, an unfortunately small type has been chosen; the styles of type used for chapter headings and subdivisions are quite satisfactory. The work also suffers from lack of a critical evaluation of the subject matter. It would be much more useful to the student if yields were given more generally. The representation of electronic configurations used is confusing and wasteful of space.

The "Outline" will unquestionably be useful as a reference book; it contains a wealth of material which will be welcomed by the research chemist. We cannot agree with the author that it would be useful as a textbook; the bewildering mass of factual material and the lack of critical evaluation of the greater part of it will militate against the choice of the "Outline" as a text.

Nathan L. Drake

Studies on Nitrocellulose Including the Construction of an Osmotic Balance. By Ingvar Jullander. G. E. Stechert and Co., 31 East 10th Street, New York, N. Y. (Almqvist and Wiksells Biktryckeri-A.-B., Stockholm, Sweden), 1945. 142 pp. 66 figs. 14 × 22 cm. Price, 4:50 Swedish crowns.

This, the author's thesis for the doctorate, deals primarily with the determination of molecular weight distribution in samples of high polymers, using osmotic, viscosity, diffusion, sedimentation equilibrium and sedimentation velocity data. The complex theoretical relationships are carefully discussed and new experimental measurements on a number of unfractionated nitrocelluloses are presented and analysed.

An osmotic balance, for accurate measurements of osmotic pressure in greater dilution than has heretofore been possible, is described, with photographs [see Jullander and Svedberg, *Nature*, **153,** 425 (1944)]. This balance should be quite useful to others working with high polymers.

In addition to the properties mentioned, measurements of the following are given, for the same nitrocellulose samples: nitrogen content, partial specific volume and dependence of refractive index on concentration.

Some experiments on the formation of gels by the addition of jelling agents to nitrocellulose solutions are also described. These include time of solidification, viscosity and ultracentrifuge studies.

The book is well printed on good paper, but the cover material is only heavy paper.

The reviewer recommends this book to those interested in nitrocellulose, osmotic pressure or the distribution of molecular weights in substances composed of large molecules.

Maurice L. Huggins

Studies in Biophysics: The Critical Temperature of Serum (56°). By Lecomte Du Noüy, D.Sc., Formerly Associate Member of the Rockefeller Institute, Formerly Head of Department of Molecular Biophysics at the Pasteur Institute, Director of the Laboratory of Molecular Serology, University of Paris. Reinhold Publishing Corp., 330 West Forty-Second St., New York, N. Y., 1945. vi + 185 pp. 89 figures. 15 × 23 cm. Price, $3.50.

This book is a report of experiments, carried out by the author and a few of his associates over a period of more than twenty years, on the physical changes in serum caused by heating. It contains detailed descriptions of the experimental procedures employed and discussions of a vast amount of data of enviable precision.

When the physical properties of serum are followed during continuous heating, it is found that at about 56° the viscosity, the specific rotation, the rotatory dispersion, the absorption of light, the scattering of the light, the degree of depolarization of the scattered light and the electric resistivity increase sharply. The power of fixation of ether decreases, and the sedimentation of the globulins upon dilution with water and the interfacial tension against mineral oil are modified. At slightly higher temperatures the hydrogen ion concentration is increased and the ultraviolet absorption curve is modified. The physical changes at 56° parallel the destruction of a biological property of serum known as alexin or complement.

The author interprets most of these physical changes as being due to an intramolecular hydration of a postulated complex "lipido-proteinic molecule of serum." It is to be regretted that the advances made in the past two decades in theoretical colloid physics and in protein and polymer chemistry were not utilized in interpreting these data and that the findings were not correlated with some of the excellent physicochemical studies on the denaturation of serum proteins which have appeared in recent years. The attempt to explain the physical changes induced by heating serum solely on the basis of hydration is not consistent with present day knowledge of the behavior of proteins. Even the data presented in this book contradict such an interpretation. For example, it was found that heating at about 56° caused increases in the intensity of scattered light as much as a hundred fold in magnitude. This is interpreted as being due to an increase caused by hydration

of as much as ten-fold in the volume of the particles.. Yet the Rayleigh equation, which was utilized erroneously in this interpretation, contains a refractive index term which, according to the refractive behavior of mutually miscible materials, should decrease upon hydration by approximately the same factor as the volume increases. The net effect of hydration upon light scattering should be very little if anything. The fact that hundred fold increases in scattering are observed is proof that some molecular change other than hydration has occurred.

Because this book contains high quality data not available elsewhere, it will be a valuable possession for all persons interested in the physical properties of living materials and of biochemical systems. The student of these matters will probably wish to formulate his own interpretation of the results.

MAX A. LAUFFER

Fungicides and their Action. By JAMES G. HORSFALL, Ph.D., Chief, Department of Plant Pathology and Botany, Connecticut Agricultural Experiment Station. The Chronica Botanica Co., Waltham, Mass.; G. E. Stechert and Company, New York City, 1945. 239 pp. 15 × 23 cm. Price, $5.00.

This is the first attempt to bring together many of the newer concepts on fungicides, the mechanism of their action and philosophy of evaluation, and the result has been on the whole very successful. The typical informal style and similes of the author may surprise some, but are interesting. Leading chapters deal with laboratory assay, data assessment, principles of chemical protection, disposition, coverage, tenacity, artificial immunization and chemotherapy, the fungicidal action of copper, sulfur and organic compounds, antagonism and synergism, and phytotoxicity. A bibliography of about 500 titles is given at the end, which includes many not so well known references. The work could have been appreciably improved by the addition of more graph-type figures and from sources in addition to the author's. Also, there is perhaps a tendency to oversimplification.

There is a good discussion of laboratory assay, i.e., in *in vitro* techniques, with special emphasis on the slide germination method and author's horizontal sprayer. However, recent comparable developments in laboratory precision evaluation of disease control on living plants have been omitted. The uninitiated should welcome the discussion on the fundamental dosage–response curve, its slope and straight line plot on logarithmic probability scale. These concepts first introduced into the laboratory bid fair to assume an increasingly important role also in field studies. The chapters on disposition, coverage, and tenacity embody in particular many of the author's own concepts and contributions and are illuminating. The discussion on the action of organic compounds seems somewhat expanded in view of the limited information on the nature of their action as fungicides, but will be of timely interest.

The book is essential to all fundamentally concerned with fungicides. It is an excellent source book and perhaps best of all, by reason of the many controversial issues raised will stimulate further research on fungicides and their action.

S. E. A. MCCALLAN

Theory of X-Ray Diffraction in Crystals. By WILLIAM H. ZACHARIASEN, Associate Professor of Physics, University of Chicago. John Wiley and Sons, Inc., 440 Fourth Avenue, New York (Chapman and Hall, Ltd., London), 1945. iv + 255 pp. Illustrated. 14 × 22 cm. Price, $4.00.

This is the first American book which attempts to present a general logical treatment of the theory of crystallinity, and the theory of X-ray diffraction in crystals. It is an outstanding book. The emphasis is completely on theory and mathematical development, there is no treatment of experimental techniques and relatively little comparison between theory and experimental results.

Chapter I deals with the nature of crystals, and presents in rather concise form the fundamental concepts of crystallinity, and the mathematical representation of the crystal lattice, and the reciprocal lattice. Chapter II presents a logical mathematical development of the theory of point groups, translation groups and space groups. Chapter III deals with X-ray diffraction in ideal crystals, and gives the intensity theory for the small crystal, together with a very complete and basic treatment of the dynamical theory of X-ray diffraction, with and without the effect of absorption. Part of this material is the author's own contribution, and is not to be found elsewhere.

Chapter IV deals with X-ray diffraction in real crystals. Departures from the ideal crystal such as mosaic structure, effect of temperature vibration and certain types of randomness are discussed in this chapter.

The beautifully concise and elegant presentation in this book will have a great appeal to some readers, but for the average reader it will make difficult the effective use of the book. Where too many steps are left out in progressing from one equation to the next, a book loses much of its potential usefulness; some readers are not able to fill in the missing steps and others do not have the time. In its present form the book will not have the general usefulness which it might have had. It is to be hoped that in the next edition the author will expand the book by at least fifty per cent., and make a serious effort to present the material in a form which is more easily read by the average X-ray diffraction worker.

B. E. WARREN

BOOKS RECEIVED

February 10, 1946—March 10, 1946

HARRY BARRON. "Modern Plastics." John Wiley and Sons, Inc., 440 Fourth Avenue, New York 16, N. Y. 680 pp. $7.50.

C. W. BUNN. "Chemical Crystallography." Oxford University Press, 114 Fifth Ave., New York, N. Y. 422 pp. $7.50.

JULIUS GRANT, Editor. "Hackh's Chemical Dictionary." Third Edition with Changes and Additions. The Blakiston Company, Philadelphia 5, Pa. 925 pp. $8.50.

VICTOR K. LAMER, Editor-in-Chief, *et al.* "Journal of Colloid Science," January, 1946. Volume I, Number 1. Academic Press, Inc., Publishers, 125 East 23rd Street, New York 10, N. Y. Published bi-monthly at $10.00 a year.

P. NIGGLI. "Grundlagen der Stereochemie." Verlag Birkhäuser, Basel, Switzerland. 283 pp. 32.50 Swiss francs. (cloth bound).

Staff of Hopkin and Williams Research Laboratory. "Organic Reagents for Organic Analysis." Chemical Publishing Co., Inc., 234 King St., Brooklyn 31, N. Y. 175 pp. $3.75.

E. W. R. STEACIE. "Atomic and Free Radical Reactions." Reinhold Publishing Corporation, 330 West 42nd St., New York, N. Y. (A. C. S. Monograph Series.) 548 pp. $8.00.

W. THEILHEIMER. "Synthetische Methoden der Organischen Chemie." Vol. I. S. Karger, Verlagsbuchhandlung für Medizin, Holbeinstrasse 22, Basel (Schweiz), and New York. 224 pp.

A. F. WELLS. "Structural Inorganic Chemistry." Oxford University Press, 114 Fifth Avenue, New York 11, N. Y. 590 pp. $7.50.

"Code for the Prevention of Dust Explosions in the Plastics Industry." (ASA Z 12.16 — 1945). Published by the National Fire Protection Association International, 60 Batterymarch Street, Boston 10, Mass. 22 pp. 25 cents.