

• *New Books*

HANDBOOK OF CHEMISTRY, Tenth Edition, compiled and edited by Norbert Adolph Lange (McGraw-Hill Book Company, New York, N. Y., 1969 + xiv pp., 1961, \$11.00). The "Handbook of Chemistry" has been known and accepted, not as a library reference text, but as a laboratory work-saving tool, for over a generation by chemists engaged in every phase of the science. As such it needs no introduction to the fatty acid or lipid chemist.

The Tenth Edition of the "Handbook" is both enlarged and revised, some of its hundreds of tables being completely rewritten. The 1969 pages are divided into four major sections. The first, Life and Fire Hazards, consists of 49 pages of tabulations of common hazardous chemicals, properties of flammable liquids, gases and solids, first aid measures for accidents, and antidotes of poisons. This useful information is followed by a 1028 page section on Chemical and Physical Properties of Classified Substances. This section contains, among others, the familiar tables describing each of the chemical elements, their physical properties, an extensive table of nuclides, and compilations of the properties of minerals, inorganic compounds, and organic compounds; the last, enlarged to 440 pages, lists 6507 compounds. Included also are tabulations of the physical properties of special groups of materials as the alkaloids, glucosides, hormones and, of special interest to the lipid chemist, fats, oils, and waxes. This section, keeping abreast of modern developments, also contains tables of the properties of materials of construction, formulas and properties of thermoplastic materials, the composition and physical properties of alloys, and tables of commonly used ceramic materials with their formulas and equivalent weights. Tables for the analytical chemist appear toward the end of the second section and include qualitative spectrographic analysis lines, lists of the sensitive lines of the elements, organic reagents for inorganic analysis, common laboratory solutions, reagents, indicators and volumetric (titrimetric) solutions. Included also are tables of equations and equivalents for titrimetric analysis volumetric and gravimetric factors and their logarithms and half-wave potentials of inorganic and organic compounds.

The last two major sections are entitled Miscellaneous Tables of Specific Properties, 711 pages and Conversion Factors and Numerical Tables, 181 pages. The former contains the now well-known and very useful tables of trade names with their chemical synonyms and formulas, tables of solubilities, densities, specific gravities, electrical properties, vapor pressures, and thermal properties. Also included, among many others, are tables of index of refraction, x-ray emission of the elements, and total mass absorption coefficients. The final section contains a 42-page table of conversion factors, viscosity, and temperature conversion tables and mathematical tables including tables of areas and volumes, squares and cubes, reciprocals, circumferences, and 31 pages of logarithm tables.

The Handbook has a comprehensive index of 27 pages, which is said to contain nearly 3000 entries.

To the few, if any, lipid chemists who have not discovered the useful Handbook of Chemistry working tool, it can be unqualifiedly recommended to save unlimited time in library search. To the more numerous lipid chemists who have been using it continually as a laboratory working tool, attention might be called to this newly revised and enlarged edition as a sharpened working tool, for time, with the continual determination of additional recorded data has dulled earlier editions.

The objective of the volume cannot be expressed more eloquently than its simple dedication: "To those workers in science who through their labors determined the values recorded herein, this compilation is dedicated. Their devotion to the search for the constants of nature and the dissemination of this knowledge are the foundations upon which rest the achievements of applied science."

ROBERT T. O'CONNOR, Southern Utilization Research and Development Division, New Orleans, La.

SCIENTIFIC THINKING AND SCIENTIFIC WRITING, by M. S. Peterson (Reinhold Publishing Corporation, New York, 215 pp., 1961, \$6.95). This book would be most useful to a graduate student or to a technically trained individual who would like to become acquainted with the various systematic methods which are used in scientific writing. The book would not be as useful to experienced writers as "Style Guide for Chemists," by Louis F. and Mary Fieser.

Scientific Thinking and Scientific Writing is divided into five chapters: The Genesis of Scientific Thought and Writing, Classic Methods of Inductive Reasoning and Their Application to the Organization of Scientific Articles and Reports, Some Specific Methods and Techniques and Their Relationships to Experimental Design and the Interpretation of Data, Building a Professional Background for Scientific Writing, Types of Scientific Writing and Thinking. Dr. Peterson has included an example of an essay or scientific paper from the published literature for each of the main points he discusses. These examples are representative although their length tends to distract the reader from the subject at hand and interrupt the logical flow of ideas that Dr. Peterson has presented. It may have served his purpose equally well to have grouped the examples in an appendix. The book should become a useful addition to the literature on scientific writing.

F. A. KUMMEROW, University of Illinois, Urbana, Ill.

DIGESTIVE PHYSIOLOGY AND NUTRITION OF THE RUMINANT—Proceedings of the University of Nottingham Seventh Easter School in Agricultural Science, 1960. Edited by D. Lewis (Butterworths, London, 297 pp., 1961, \$9.50). This book is divided conveniently into three parts headed as follows: I Physiology of the Rumen, II Metabolism in the Rumen, and III Ruminant Nutrition and Endocrinology. A total of 23 chapters has been contributed by different authors for each paper. The chapters are distributed approximately equally among the parts, and several of them are complemented by notes covering the ensuing group discussions. In addition, each paper is supplemented with pertinent references up to the date of the meeting. Adequate author and subject indices allow ready access to the material covered.

The scientist who wishes to keep informed of the progress in physiology and nutrition of the ruminant will find this book indispensable. He will appreciate the thorough coverage of the various aspects of research, and still realize that many complex phenomena of rumination have not been solved.

The movement of digesta, nervous control, secretions, absorption, and eructation are all discussed under Physiology of the Rumen.

In the part on Metabolism in the Rumen a brief description of rumen microbiology is presented along with counting techniques. The metabolism of carbohydrates, nitrogenous compounds, and lipids is reviewed. Mineral ratios and their effects on osmotic pressure and acid base equilibrium are ably discussed. Techniques for metabolic studies such as the use of radioisotopes for following the absorption of organic acid have received special attention.

The third part, Nutrition and Endocrinology, deals specifically with syntheses of vitamins and proteins, and with energy requirements and utilization. The relationship of cellulose digestibility to other dietary constituents is re-emphasized. Attention is drawn to the endocrine control of metabolism and growth with reference to estrogen stimulation of the pituitary.

In view of the composition of the book as derived from a series of conference papers, naturally it lacks the continuity of subject matter and integrated thought of a normal textbook. Nevertheless it should be of real value to all interested in the science of the ruminant.

J. CRAIG ALEXANDER, The Procter & Gamble Company, Cincinnati, Ohio

CHROMATOGRAPHIC AND ELECTROPHORETIC TECHNIQUES, Vol. I Chromatography, edited by Ivor Smith (Interscience

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Distillation Products Industries
is a division of **Eastman Kodak Company**

Publishers, Inc.—617 pages—1960—\$10.75). In less than two years from the appearance of the first edition, Ivor Smith and his collaborators have now produced a considerably expanded two volume edition. From this we may judge the enthusiastic response to the highly practical approach taken by the editor of this book.

Those who are familiar with the first edition will have come to value the definitive tone of the "positive thinking" that so clearly distinguishes it from other books which are content to list what others have said and leave the reader to work out his own salvation. The greatly expanded second edition (in Vol. I both by rewriting of chapters, and by addition of new ones on radioactive compounds, ion exchange celluloses, column chromatography, and various types of plant constituents) rigidly maintains the original philosophy. This is definitely a book for the do-it-yourself type, and one than can be most highly recommended. If you could afford only one book on chromatography, this would have to be your choice.

While gas chromatography continues to be all the fashion in the fats and oils area, it is well to remember that paper and column chromatography are not yet completely passé. Chapters describing these techniques as applied to cholesterol esters and their fatty acids, phospholipids and their derivatives, and steroids and clinical applications, are particularly useful; and, incidentally, are also illustrative of gas chromatography's deficiencies in these areas. A discussion of the supplementary nature of all chromatographies would have been welcome, and especially on the value of combined techniques such as thin-layer and gas chromatography.

However, this is an omission which is more than adequately compensated for by excellent chapters on plant phenols and phenolic acids, as well as the usual topics of amino acids, sugars, acids, alkaloids, purines, etc.

I apologize for the cliché, but this book really does belong o.e.c.d.—that is, if you can convince the librarian. It is well worth the try.

DONALD A. M. MACKAY, General Foods Corporation, Tarrytown, N.Y.

AUTOXIDATION AND ANTIOXIDANTS, Vol. I, edited by W. O. Lundberg (Interscience Publishers, Inc., New York, 450 pp., \$15.50). This volume is, in effect, a review but is written and organized with the clarity and completeness of a textbook. This is the first of two volumes covering the theoretical as well as practical aspects of autoxidation, and the inhibition of oxidation by antioxidants. The theory and fundamental chemistry of autoxidation and antioxidants are covered in detail in this volume.

The first of ten chapters comprehensively covers the background and the basic theory concerning the primary products of olefinic autoxidation. Subsequent chapters cover such topics as: The Mechanism of Antioxidation, Photochemical Autoxidation, Autoxidation by Ionizing Radiation, and the Analysis of Autoxidation Mixtures, to cite a few.

The volume is well composed and substantially free from typographical errors. The material is timely, and will certainly save time which would ordinarily be lost retrieving such information from the literature.

A book of this type should be part of the library of every scientist involved in lipid research. However, it is felt that the cost of this volume is too high to receive the distribution it deserves.

R. W. BATES AND J. G. ENDRES, Food Research Division, Armour and Company, Chicago, Ill.

AN ALGORITHM FOR TRANSLATING CHEMICAL NAMES TO MOLECULAR FORMULAS, by E. Garfield (Institute for Scientific Information, Philadelphia, Pa., 68 pp., 1961, \$5.00). The reviewer found the reading of this short thesis a rewarding and stimulating experience. Dr. Garfield has performed a service to the chemical world by his analysis of the past and present state of the chemical nomenclature and his use of linguist analysis to the problem of chemical nomenclature, arguing that as a sub-language of English it can be treated "as a structural linguist would treat a previously undescribed language." As Director of the In-

stitute for Scientific Information and publisher of the Index Chemicus, he has an abiding concern in the problems attendant to the swelling chemical literature, its indexing and its retrieval. Although his application of linguistic analysis has been limited to acyclic compounds, the results show that the technique can be expanded to the whole area of organic structures. The analysis has shown that given a chemical name, the molecular formula can be quickly derived by any person (albeit with some slight training) without reference to a structural formula, using only eleven rules that guide the parsing of the name into locants, parentheses, and morphemes that can function as multipliants or addends. This analysis has shown that the hydrogen count can be obtained by a generalization of Soffer's formula. This technique then can be used to enable a computer to take over this "chore." Indeed the detailed computer program is discussed as are the results of its application to a randomly selected sample.

The book is organized into three broad areas: 1) Organic chemical nomenclature-historical background; 2) Intellectual indexing tasks requiring study; 3) Structural linguistics approach to chemical nomenclature. The first section may ruffle some parochial fathers, such as the statement: "the special language of organic chemistry should be taught first." The statements regarding the state of organic chemistry sound too sweeping, as do the implied criticisms of the Geneva Conference (1842), and the 1930 and 1957 Reports on Nomenclature. Considering the amount of give and take, and effort involved in these Reports, one shudders to think of being without them. This, however, begs the question. There is a real problem and this represents an important step to meet it. The analysis itself has its own arbitrary features; thus, the nitrogen in a quaternary amine is considered to be pentavalent so that the "ium" morpheme is given a DB (double bond) value of a "bonding" morpheme. Following this logic the nitrogen in a tertiary amine oxide should behave similarly; yet this would lead to the wrong hydrogen content. Exception is taken to the statement that "the chemist does not usually think of a triple bond as being two double bonds." This, as stated, is just not true. The chemist treats the triple bond as a functional group with quite distinctive properties from a double bond as a functional group but he realizes that formally the former is equivalent to two double bonds—if he doesn't he should not be called a chemist. There is a mistake of a minus sign in the fourth line of second example (p. 34); it should be a plus sign.

The reviewer feels that every chemical library should have this small volume; it is literally a breath of fresh air in what is usually treated in a moribund manner. It would repay every chemist many times the effort required to read it.

JOHN S. SHOWELL, Eastern Regional Research Laboratory, Philadelphia, Pa.

INDUSTRIAL PROCESS CONTROL, by L. M. Zoss and B. C. Delahooke (Delmar Publishers, Inc., Albany, N. Y., 256 pp., 1961, \$5.75). The express purpose of this book is to provide a simplified explanation of the basic principles of process control instrumentation. The instruments used have already been described by one of the authors (Industrial Control Instruments by B. C. Delahooke, Delmar Publishers, Inc., 1957) and are therefore not covered again.

The book is in two parts; Part I covers the theoretical considerations. This is developed slowly, in as simple a manner as is possible for the subject matter. Complicated mathematical development is avoided by the substitution of straight line approximations for the more complex curves, and by an abundance of graphic plots. The theory is developed, beginning with the consideration of individual components of a system, through the various aspects of combining these components into the complete control system.

Part II is concerned with various industrial applications of process control. These include food preservation by canning, freezing, and dehydration; the dairy, sugar, and brewing industries; and the operation of boilers, compressors, reactors, air conditioning equipment, and fractional distillation columns. None of the examples pertain

directly to the fat and oil industries although the principles involved can readily be translated into parallel situations in fat and oil processing.

The painstakingly slow development of the entire concept of instrumentation of process control as given in this book should be welcomed by anyone who is interested in the subject but who has had little or no background in the matter.

T. J. WEISS,
Swift & Company, Chicago, Ill.

SYMPOSIUM ON MICROSTRUCTURE OF PROTEINS, edited by C. G. Overberger (Interscience Publishers, Inc., New York, 175 pp., 1961, \$6.00). This small volume, reminiscent of an issue of *The Journal of Polymer Science*, as indeed it was originally, is an apt summary of certain aspects of our knowledge of protein molecular structure as of September 1960. The volume is a collection of papers given at a symposium held during the 138th National Meeting of the American Chemical Society at New York, sponsored jointly by the divisions of Biological Chemistry, Physical Chemistry, and Polymer Chemistry. The symposium was planned and organized by C. G. Overberger, W. H. Stein, E. R. Blout and H. A. Scheraga.

The first of the seven papers presented at the symposium was by F. Sanger, who discussed the topic of "The Sequence of Amino Acid Residues in Proteins" in his usual masterly fashion. C. B. Anfinsen then considered "The Influences of Three-Dimensional Configuration on the Chemical Reactivity and Stability of Proteins." Organic chemists will find P. G. Katasoyannis' presentation on "Peptide Synthesis and Protein Structure" of interest. Though relatively speculative, the discussion of "The Function of Neighboring Groups and Side Chains in the Enzyme Chymotrypsin," by M. L. Bender and co-workers, presents some insight into the action of the enzyme which may largely prove to be valid when a great deal more is positively known about the enzyme. The topic of "Phase Changes in Proteins and Polypeptides," presented by P. J. Flory, is one which should have increasing application. J. A. and C. G. Schellman presented a lucid discussion of "Use of Rotatory Dispersion in the Determination of Protein Structure." The symposium closed with a highly interesting review, by B. W. Low, on "The Use of X-ray Diffraction in the Determination of Protein Structure." This largely centered on the fine work of Kendrew, Perutz, and their co-workers in their studies of myoglobin and hemoglobin.

In a sense, it is difficult to discover for whom this volume is intended. The various papers serve only as a jump-off point for one who is interested in one of the fields discussed, but are often too involved for one who wishes only to know what is going on in the study of protein structure. Perhaps they are designed to increase the awareness of those working in one of the areas presented, of advances which have been made in the other areas.

T. H. DONNELLY,
Swift & Company, Chicago, Ill.

SYNTHETIC METHODS OF ORGANIC CHEMISTRY, Vol. 14, by W. Thielheimer (Interscience Publishers, Inc., New York, 549 pp.; 1960, \$29.50). In this series Dr. Thielheimer provides a rapid and convenient means by which information on details of recently reported synthetic procedures may be obtained. The ever-increasing volume of publications makes this effort to collect and catalogue new developments even more important than in the past.

The inclusion in later volumes of a well referenced section devoted to current trends furnishes a brief introduction to rapidly developing areas of organic chemistry. For example, one paragraph devoted to the chemistry of boron compounds cites seventeen leading references. The value of such a convenient guide is obvious.

Dr. Thielheimer's classification by reaction symbols is undoubtedly inconvenient for the occasional reader; however, a conventional index supplements the classification system and appears to obviate this often discussed feature of the series.

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