

---



---

## NEW BOOKS

---



---

**Major Instruments of Science and Their Applications to Chemistry.** R. E. BURK and OLIVER GRUMMITT, Editors. Interscience Publishers, Inc., 215 Fourth Avenue, New York 3, N. Y., 1945. 15.5 × 23.5 cm. 151 pp. Price, \$3.50.

This little book records the contents of a series of lectures delivered at the Western Reserve University. The subject matter is chiefly concerned with new instrumental techniques and their application to the solution of problems of interest to chemists. The volume is divided into the following sections: Electron Diffraction and the Examination of Surfaces, by Lester H. Germer (14 pages); The Electron Microscope and Its Applications, by L. Marton (21 pages); X-Ray Diffraction and its Applications, by Maurice L. Huggins (27 pages); Chemical Spectroscopy, by Wallace R. Brode (27 pages); Application of Absorption Spectra to Chemical Problems by Wallace R. Brode (26 pages) and The Infrared Spectrometer and Its Applications by R. Bowling Barnes (27 pages).

The style of the book is non-mathematical, and it is well illustrated. It provides a short but authoritative survey of the field it attempts to cover. While the several treatments differ, they are largely devoid of uninteresting detail. Unfortunately, this type of treatment has a tendency to overrate the power of the methods. For example, the reviewer believes that Huggins has inadvertently understated the weaknesses of crystal structure analysis. Except in favorable cases, this method of investigation, even with its most modern theoretical tools, is something of a guessing game restricted by rules which prevent impossible and certain improbable solutions. This is worth emphasizing to those not working in the field, for it is the major barrier limiting our knowledge of complex structures. Protein structures are still beyond our guessing range, as are many much simpler structures.

This book should prove particularly valuable in providing the reader with an appreciation of his colleagues' fields, and in suggesting possible applications to his own problems of techniques developed in bordering fields.

M. J. BUERGER

**Bioenergetics and Growth.** By SAMUEL BRODY, Ph.D., Chairman, Committee on Growth and Energy Metabolism, College of Agriculture, University of Missouri, Columbia, Mo. A Publication of the Herman Frasch Foundation. Reinhold Publishing Corporation, 330 West 42nd Street, New York, N. Y., 1945. xii + 1023 pp. 15.5 × 23.5 cm. Price, \$8.50.

It is refreshing to encounter a book in which the literature in a rather broad field of endeavor is thoroughly reviewed and the available data completely integrated, interpreted and evaluated. To some extent this volume represents a summary of the results of the researches sponsored by the Herman Frasch Foundation for Research in Agricultural Chemistry at the Missouri Agricultural Experiment Station but much additional fundamental information is included. A tremendous quantity of data is recorded not only because of the length of the book but because most of the illustrations, graphs and tables are so reduced in size (perhaps to too great an extent in some cases) that they require much less space.

Another important contribution by the author is the inclusion of frequent summaries at the end of certain chapters and as entire chapters (Chaps. 1, 10, 25) in other cases. In fact, the present reviewer cannot improve upon the author's summary of the important parts of the book, namely, "our original material is on energy and nitrogen metabolism (Chaps. 13-15) including some bioenergetic methods (Chap. 12), on energetic efficiency of the pro-

ductive processes (Chaps. 3 and 21-24), and on various aspects of growth (Chap. 16), aging (Chap. 18) which we consider as inseparable from growth, on the interrelation between part and whole (Chap. 17) which we consider inseparable from the relation of energy metabolism to size (Chaps. 13-15), and on physiological time and equivalence of age (Chap. 19).

Naturally the factors influencing efficiency were analyzed, such as the influence of plane of nutrition (Chaps. 4 and 5), metabolic catalysts, including enzymes, minerals and vitamins (Chap. 6), hormones (Chap. 7), season (Chap. 8), time of day (Chap. 9), temperature (Chap. 11) and nutritional balance (Chap. 20). Likewise, the factors influencing profit were discussed with special reference to plane of nutrition (Chap. 5), body size (Chap. 22), productive plane ("dairy merit" in cattle, Chap. 22; muscular work in horses, Chap. 24; egg production, Chap. 23)."

This book will undoubtedly remain a reference book and a most valuable one for biochemists, nutritionists, biologists, animal, dairy and poultry husbandmen and economists. However, it would be interesting to use this volume as a text-book in an advanced course in nutrition. Surely any student could learn a great deal about enzymes, minerals and vitamins in biologic oxidations, from chapter 6. The tables on pages 768 to 771 showing the vitamin requirements of different species are an excellent attempt to correlate the present available information.

There are a few small errors. For example, on page 973, one ångström does not equal 0.001 micron but rather 0.0001 micron. But the errors are remarkably few when one considers the large amount of tabular matter.

C. A. ELVEHJEM

**The Characterization of Organic Compounds.** By SAMUEL M. McELVAIN, Professor of Chemistry, University of Wisconsin. The Macmillan Co., 60 Fifth Avenue, New York, N. Y., 1945. 282 pp. Price, \$3.40.

This small volume represents a new approach to the problem of the identification of organic compounds, a subject which today is justly part of the curriculum of every large college and university. While the author is quick to admit his debt to a number of predecessors including notably Mulliken and Huntress, Kamm, and Shriner and Fuson, he has through several compact and well written preliminary chapters given additional point and meaning to the subject of Organic Qualitative Analysis.

These chapters with no small success attempt the correlation of the significant physical properties (boiling points, solubilities in water, ether, dilute acid or base, and in concentrated sulfuric acid) with molecular structure. Helpful generalizations are drawn from ample illustrations of the concepts of hydrogen bonding, chelation, electronic theory, acid-base reactions and positional isomerism. Compressed into probably less than 100 pages are numerous examples of logical reasoning which cannot fail to stimulate the able student or be of ready reference value to the more independent and advanced worker.

The scheme of analysis is the popular one based on the solubilities of the unknown compound in a number of solvents. It has always seemed to the writer that this scheme is inherently less desirable than that on which the Mulliken-Huntress tables are based; namely, elemental analysis and functional group reaction. It cannot be denied, however, that there is considerable logic in class reactions regardless of elemental content and, in the hands of resourceful and ingenious workers who are not readily confused by borderline cases of solubility classification, the system works well. Both approaches are covered in this work. The reactions of the compounds falling in the differ-

ent solubility classes are the subject of Chapter IV (47 pages) while the reactions expected of the different functional groups are given in Chapter VII (81 pages including many tables of data).

Throughout the book are numerous pages of questions and problems which should greatly enhance its usefulness in a second-year course in organic chemistry. A careful reading happily disclosed only one minor error (p. 27—Table VIII, p. 68 should be Table VII, p. 66). The print is extremely legible, the format attractive and the text remarkably readable. Interspersed are observations of a most useful and practical kind, the result of a great fund of experience. For these reasons, the volume should prove a popular addition to the research worker's library, and a valuable text for class use.

WARREN C. LOTHROP

**Advancing Fronts in Chemistry. Volume I. High Polymers.** SUMNER B. TWISS, Editor, Department of Chemistry, Wayne University, Detroit, Michigan. Reinhold Publishing Corporation, 330 West 42d Street, New York, New York, 1945. 196 pp. 15.5 × 23.5 cm. Price, \$4.00.

This book contains ten lectures given at Wayne University in 1944, with the objective of presenting unified concepts of certain phases of polymer science. Because of the limitations of space, the first two chapters by Mark and Kistler, dealing with the general relationships between polymer structure and physical properties, are neither descriptive enough to be of much help to the beginner nor mathematical enough to satisfy the expert. Contrasted with these, the mathematical but very lucidly presented short chapter by Stockmayer makes an excellent basis for classroom presentation of condensation polymerization, and at the same time should be read by any polymer chemist who has not followed Flory's and Stockmayer's original papers.

The longer chapters dealing with physical properties of polymers are more successful than the first two. In particular, Baker gives a great many data on the structure and properties of polyamides and some other polymers, showing how the manner of packing of the chains and the physical properties vary in an understandable manner with apparently minor changes of structure. Ott has kept in mind the requirements of the beginner as well as the advanced worker in his discussion of the reasons why the physical properties of polymers vary with chain length and chain-length distribution. He also gives enough data on strength, flex resistance, elongation and flow properties of cellulose derivatives to make his story complete. A somewhat shorter chapter, by Harris, on fibers deals mainly with the very interesting effects of disulfide cross links on wool properties. The chapter on variation of mechanical properties of concentrated solutions with rate of application of load, illustrated by Ferry with a few graphs, is tantalizing. The treatment is good, though elementary. However, the author has missed many opportunities for pointing out to the worker in the field how to apply to everyday problems the concepts illustrated by him.

Two purely chemical chapters, by Price and by Mayo, both dealing with free radical polymerization, deserve especial note. Price shows how peroxides form free radicals, and how these free radicals are consumed by chain initiation, recombination, disproportionation and transfer reactions. He further discusses the connection between inhibition and the stabilization of free radicals by resonance. Mayo has used the concepts of varying reactivity and relative stability of free radicals to show that chain

transfer may be treated quantitatively, and that copolymerization cannot be studied effectively until we are able to measure free radical concentration.

The remaining chapter, by Pitzer, on catalysis of hydrocarbon reactions to produce monomers, will not be of interest to the average polymer chemist.

The reviewer would like to repeat the frequent request that chapter headings be repeated at the top of the page, particularly if references are given at the end of the chapter, as in this case. He also feels that editors of such collections should make sure that the contributions are more consistent in type of treatment than is the case with this book.

At the suggestion of the author, the following corrections should be noted: Page 84, line 20, should read "The weight-average is normally no greater than twice the number-average." Page 97, line 24, "weight-average" should be "number-average." Page 101, line 1, should be "— the logarithm of the viscosity of the plastic melt increases linearly with the square root of the chain length."

This book should be available to every teacher and worker dealing in fundamental polymer science. The price is too high and the treatment often too brief to justify use as a text or reference book.

H. M. SPURLIN

## BOOKS RECEIVED

November 10, 1945–December 10, 1945

- ED. F. DEGERING. "An Outline of Organic Nitrogen Compounds." University Lithoprinters, Ypsilanti, Michigan. 752 pp. \$7.50.
- ROBERT S. HARRIS AND KENNETH V. THIMANN, Editors. "Vitamins and Hormones. Advances in Research and Applications." Vol. III. Academic Press, Inc., 125 East 23rd St., New York, N. Y. 420 pp. \$6.50.
- JAMES G. HORSFALL. "Fungicides and their Action." The Chronica Botanica Company, Waltham, Mass. (G. E. Stechert and Company, New York, New York). 239 pp. \$5.00.
- HENRY E. MEDBERY, Editor. "The Manufacture of Bottled Carbonated Beverages." Issued by American Bottlers of Carbonated Beverages, 1128 Sixteenth Street, Washington, D. C. 17 pp.
- JUAN TOMAS ROIG Y MESA. "Plantas Medicinales, Aromáticas o Venenosas de Cuba." Parts I and II. Office of Publicity and Publication, Ministry of Agriculture, Havana, Cuba. 872 pp.
- W. W. PIGMAN AND M. L. WOLFROM, Editors. "Advances in Carbohydrate Chemistry." Vol. I. Academic Press, Inc., 125 East 23rd Street, New York, N. Y. 374 pp. \$6.00.
- ELLIS W. SHULER. "Rocks and Rivers of America." The Jaques Cattell Press, Lancaster, Pa. 300 pp. \$4.00.
- N. TROENSEGAARD. "On the Structure of the Protein Molecule." Einar Munksgaard, Publisher, Nørregade 6, Copenhagen, Denmark. 126 pp. Dan Cr. 14.00.
- THEODORE VAN SCHELVEN. "Weiss Magnetons as Components of Nuclear and Subnuclear Structures." Kosmos Publishing Company, Keizersgracht 133, Amsterdam, Holland. 32 + pp.
- "Wood Products for Fertilizer." Northeastern Wood Utilization Council, P. O. Box 1577, New Haven, Conn. 72 pp. \$1.00.