

tion had thus increased about 700-fold by reason of the promoter action of the chromium oxide. The promoted catalyst also showed a much increased adsorptive capacity per gram. The gas was reversibly adsorbed. It is evident, therefore, that in considering the mechanism of promoter action consideration must be given not only to extension of surface but also to the velocities with which the activating adsorptions occur.

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NEW BOOKS

Die Bedeutung der wissenschaftlichen Tätigkeit Friedrich Wöhlers für die Entwicklung der deutschen chemischen Industrie. (*The Importance of Friedrich Wöhler's Scientific Achievements in Developing German Chemical Industry.*) By Dr. TH. KUNZMANN. Verlag Chemie, G. m. b. H., Berlin W 10, Germany, 1930. 90 pp. 15.5 × 23.5 cm. Price, unbound, R.M. 4.

Within the space of ninety pages the author includes those discoveries by Wöhler that led to important technical processes, as well as his purely scientific achievements. He presents in thirteen chapters an admirable survey of all this great pioneer did, beginning with a list of Wöhler's papers, 223 in all, upon 160 inorganic, 54 organic and 9 biochemical subjects. Those were days when a man was a general practitioner, unconfined to a special field but roaming at will and able to say truthfully, "I am a chemist." In the second chapter is Wöhler's biography and in the next four are such technically important discoveries as the isolation of aluminum in 1827, contact production of sulfuric acid in 1852, explanation of the nature of calcium carbide with suggestions as to its use in 1862, and experiments upon titanium in 1849. Fourteen additional inorganic researches of technical significance appear in the eighth chapter, among the number being the extraction of phosphorus, refining of antimony and oxidation of ammonia.

No book about Wöhler would be complete without mention of his announcement in 1828 of the synthesis of urea. In the ninth chapter the author takes up this discovery that has overshadowed much of Wöhler's other work. The birth of modern synthetic chemistry dates from this epoch-making experiment that spurred chemists to attempt similar syntheses. The two following chapters call attention to other organic researches by Wöhler, such as those upon alkaloids and quinone, the latter leading to the preparation of hydroquinone and quinhydrone. In its subsequent development quinone chemistry has proved a fruitful field of research. His organic experiments led Wöhler to devise several ingenious methods, for example, the use of the sealed tube.

The twelfth chapter emphasizes Wöhler's eminence as a teacher. His laboratory was the Mecca of many students of chemistry. The analytical skill he had mastered under Berzelius he insisted upon imparting to his followers and his laboratory became renowned for the exactness of the work done there. Many of his students afterward acquired fame both in academic and in technical circles, among the number being Fittig, Kolbe, Beilstein and many others.

That unique episode in the history of chemistry, namely, the collaboration of Wöhler and Liebig, occupies the thirteenth chapter. Working independently, each in his own laboratory, they completed thirteen valuable pieces of work, some of which have become classical examples of chemical research. Three of these researches, namely, those upon the radical of benzoic acid, emulsin, and uric acid, are considered at length. Possibly the general adoption of this method of working might result in fewer but better papers and prevent the waste of many splendid trees.

In the concluding chapter the author summarizes Wöhler's chemical career and closes with an appendix upon the influence of the scientific labors of Wöhler, Liebig and Schönbein in developing German chemical industry.

W. H. WARREN

Ostwald-Luther. Hand- und Hilfsbuch zur Ausführung physiko-chemischer Messungen. (Physico-Chemical Measurements.) Edited by C. DRUCKER. Fifth, revised edition. Akademische Verlagsgesellschaft m. b. H., Schlossgasse 9, Leipzig C 1, Germany, 1931. xix + 979 pp. 630 figs. 16 × 23.5 cm. Price, unbound, RM. 49; bound, RM. 52.

Only a detailed comparison of the fifth with the fourth edition could make clear the extent of the improvements effected by this latest revision. The text has grown by one hundred and fifty pages, the cuts by seventy. A wealth of references has been added, with adequate recognition of English and American investigators, while increased emphasis is laid upon recent technical books and critical summaries. Each cut is now provided with a suitable legend—an overdue concession to the inexpert. Among the new topics may be mentioned electroplating, preparation of metallic wires, the sputtering of metals, diffusion electrodes, glass membrane electrodes, magnetic measurements. While minor changes appear everywhere, the sections on calorimetry, conductivity, electron tube hookups, x-rays, radioactivity, electrometric titration and electrical temperature measurements have gained the most in usefulness. The alumni of the Physikalisch-Chemisches Institut in Leipzig may feel a passing regret over the disappearance of the course of laboratory exercises once given there. By way of compensation, however, the more important (German) laboratory manuals are listed.

From the very beginnings of modern physical chemistry, "Ostwald-Luther" has embodied and furthered its progress. The latest edition sets a standard of excellence which will be hard indeed to surpass.

G. S. FORBES

Geochemie in ausgewählten Kapiteln. (Selected Chapters in Geochemistry.) By W. J. VERNADSKY. Authorized translation from the Russian, by Dr. E. KODES, Mineralogical Institute of the University of Leipzig. Akademische Verlagsgesellschaft m.b.H., Schlossgasse 9, Leipzig C 1, Germany, 1930. xii + 370 pp. 15.5 × 23.5 cm. Price, unbound, RM. 23; bound, RM. 25.

The term "geochemistry" is commonly used in two different meanings. Its first and more logical meaning is "chemistry of the Earth," with a capital E; that is, the chemistry of our planet considered as an object, in the sense in which we would speak of the chemistry of an orange or of a micro-organism. Its second and more usual meaning is "chemistry of earth" with a small e, that is, the chemistry of minerals, rocks, and soils, in which sense it is essentially a branch of general chemistry, and consists of facts that could be used, without modification, by the inhabitants of any other planet. Vernadsky's "Geochemistry" is about eighty per cent. of the first kind and twenty of the second. Twenty per cent. is no more than is necessary for a clear understanding of the other eighty, particularly if such reference works as Mellor's Volume VI or Doelter's "Handbuch" are not available. Furthermore, the inclusion of this twenty makes possible the presentation in condensed form of some of the valuable data and conclusions drawn from the experimental researches of the author, who has been a life-time investigator in mineral chemistry, and whose work was long ago recognized by his election as a member of the Russian Academy. A distinguishing feature of the strictly geochemical part of the book is the emphasis placed upon the relations of the activity of living organisms, including Man himself, to the chemistry of the Earth's surface shell. This aspect of the subject has received relatively little attention from earlier writers.

The German translator has confined himself to making a faithful transcript of the author's ideas, basing his translation on the Russian edition of 1927, which in turn was an enlargement of the original French edition of 1924. At the same time the author has rewritten certain chapters, where new experimental knowledge has made a revision desirable.

ROBERT B. SOSMAN

Stereochemie. (Stereochemistry.) By GEORG WIRTIG, Lecturer at the University of Marburg. Akademische Verlagsgesellschaft m. b. H., Schlossgasse 9, Leipzig C 1, Germany, 1930. xi + 388 pp. 127 figs. 16 × 23.5 cm. Price, unbound, M. 23; bound, M. 25.

Stereochemistry has considerably expanded during the past few years, not only in the amount of its data but in its scope, and from various sides

so much progress has been made that the real ultimate goal—to specify in absolute units the spatial distribution of atoms within molecules—is now clearly visible. This subject is no longer exclusively concerned with certain particular kinds of isomerism, and whatever one's special field as a student or investigator in organic chemistry may be, there are some topics of stereochemistry concerning which it is necessary to be informed.

The problem of finding the needed information now presents no difficulties. For a clear and concise statement of the current status of any particular problem, or for a well-ordered and thoroughly readable account of the entire field, one has only to turn to Dr. Wittig's book. Specialists in stereochemistry may find his discussion of some of their favorite topics disappointingly brief, but if there is any error of judgment in this respect, the error certainly lies in the right direction so far as the general utility of the book is concerned, and for those who are interested in details, copious references to the original literature are supplied. The only topics that have received less emphasis than their importance warrants are ones such as the stereochemistry of sugars that have already been recently reviewed in other books. On the other hand, half the book is devoted to the stereochemistry of other elements than carbon and nitrogen, stereochemistry and crystal structure, and stereochemistry and reaction kinetics, and under the second of these headings one finds discussions of the hypothesis of Reis and Weissenberg, the spatial forms of aliphatic chains, the polymorphism of organic compounds, and the stereochemistry of high polymers. The text is copiously illustrated with excellent figures. The printing is well done and there is a good index. Every organic chemist, no matter what his special interests may be, will find it worth while to own a copy of this book.

WALLACE H. CAROTHERS

Fundamentals of Organic Chemistry. BY HARRY F. LEWIS, Professor of Organic Chemistry, Institute of Paper Chemistry, Appleton, Wisconsin. International Chemical Series, James F. Norris, Consulting Editor. McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York, 1930. viii + 390 pp. 28 figs. 14.5 × 21 cm. Price, \$2.75.

As stated in the introduction, this book is intended to remedy the lack of a recent American text built specifically upon the "Atomic Linking Theory." The various classes of compounds are considered in terms of functional groups, *e. g.*, the reactions of an acid are presented as the resultant of the following groups, $-\text{C}-\text{C}$, $\text{C}-\text{H}$, $\text{C}=\text{O}$ in presence of OH and OH in presence of $\text{C}=\text{O}$.

The book is written in three parts: Part I, The Petroleum Hydrocarbons and their Monosubstitution Products; Part II, The Polysubstitution Products of the Petroleum Hydrocarbons; and Part III, The Ring Compounds.

Emphasis has been placed upon the development made in organic chemistry since the World War, many modern processes being described. There is a goodly assortment of questions and problems and also, at the end of several chapters, references are given for outside reading. However, some of these references would be rather heavy reading for a student in elementary organic chemistry, *e. g.*, "Proteins and the Theory of Colloidal Behavior" by Loeb, "The Physical Chemistry of Proteins" by Robertson, and "Recent Advances in Organic Chemistry" by Stewart.

On the whole, this book should prove to be a usable and interesting text, especially for those teachers interested in the "Atomic Linkage" presentation of organic chemistry.

BEN B. CORSON

Handbuch der biologischen Arbeitsmethoden. (Handbook of Biological Methods.) Edited by Professor Dr. EMIL ABDERHALDEN. Section I. Chemical Methods, Part 2, 2d half, Number 6. *Die Verseifung. (Saponification.)* By FRANZ BACHÉR, Rostock. Urban and Schwarzenberg, Friedrichstrasse 105b, Berlin N 24, Germany, 1930. 294 pp. 17.5 × 25.5 cm. Price, M. 16.

The present number of Abderhalden's comprehensive "handbook" deals with the saponification of all common types of derivatives of organic acids: anhydrides, chlorides, esters, lactones, nitriles, amides and anilides. It is by far the most extensive and detailed treatment of the subject that is available. By discussion of underlying principles and by very many carefully selected examples the author indicates the most promising methods for solving difficult problems in saponification, like the partial hydrolysis of derivatives of polybasic acids or of polyacid alcohols; the saponification of optically active esters and amides, of esters and nitriles of β -ketonic acids and other similarly unstable compounds, and of substances in which there is a great hindrance to hydrolysis.

Organic chemists as well as the biochemists for whom, presumably, it was primarily prepared will find in this excellent treatise much time and patience saving material.

E. P. KOHLER

BOOKS RECEIVED

December 15, 1930-January 31, 1931

- WALTER L. BADGER AND WARREN L. MCCABE. "Elements of Chemical Engineering." Introduction by Arthur D. Little. McGraw-Hill Book Company, Inc., New York. 625 pp. \$5.00.
- J. F. T. BERLINER. "Potash Bibliography to 1928 (Annotated)." Review and Compilation of Technical Literature on Potash Salts (Including the Alunites) and their Foreign Occurrences. U. S. Department of Commerce, Bureau of Mines, Bulletin 327. Government Printing Office, Washington, D. C. From Superintendent of Documents. 578 pp. \$0.90.