

NEW BOOKS

Annual Survey of American Chemistry. Volume VI, 1931. Edited by CLARENCE J. WEST, Director, Research Information Service, National Research Council. Published for the National Research Council by The Chemical Catalog Company, Inc., 419 Fourth Ave., New York, 1932. 573 pp. - 13.5 × 21.5 cm. Price, \$4.50.

The "Survey" for the year 1931 contains thirty-seven chapters varying in length from three pages (Properties of Compressed Gases) to thirty-three pages (Colloids). The selection of subjects follows along the line of the previous volumes and is sufficiently broad to include practically all research work that would naturally fall within the domain of chemistry. One misses the chapters on carbohydrates and dyes, but undoubtedly they will appear in the "Survey" for 1932 and cover a two-year period. Very complete bibliographies are included; for example, the chapter on Analytical Chemistry lists 265 different references and that on Colloids 250. The large amount of work being done in the field of insecticides and fungicides is indicated by 240 different references. The total number of references listed in the thirty-seven chapters is 3961, which gives some idea of the extent of the research work being done in the various fields covered by the "Survey." In addition to the bibliography, a number of chapters list important patents, either granted or applied for, while others suggest important problems for research.

A new member in the family of fundamental particles, the neutron, has made its appearance—at least in name. In commenting on the neutron proposed by Pauli, the authors of the chapter on "Subatomic Phenomena" write as follows: "There appears to be no definite evidence for the existence of such particles, but there is no conclusive proof that they do not exist." Attention is also called to the large number of isotopes recently added to the list—42 new ones. Probably the most interesting is the discovery of the predicted isotope of hydrogen of mass number 2. According to the "Survey," this isotope is present to the extent of about one part in 4000. More recent investigations, however, have changed this figure to one part in from 30,000 to 40,000, which shows how difficult it is for a book to keep up with the times, some statements being out of date before the book can be printed.

In reading the "Survey," one cannot help being impressed not only with the large amount of research work being done in our country but also with the fundamental character of the work. Our chemists owe a debt of gratitude to the authors of the different chapters included in the "Survey." Some of these authors have no hesitation in referring to work done in other countries and one cannot help hoping that the time may soon come when the "Survey" will become international in scope, and so take its place along with *Chemical Abstracts*, which knows no national boundaries.

WM. MCPHERSON

Outlines of Theoretical Chemistry. By FREDERICK H. GETMAN, Ph.D. Fifth Edition, Revised and Largely Rewritten by Farrington Daniels, Professor of Chemistry in the University of Wisconsin. John Wiley and Sons, Inc., 440 Fourth Ave., New York, 1931. ix + 643 pp. 180 figs. 15.5 × 23.5 cm. Price, \$3.75.

In presenting the 1931 model, the fifth edition, of this well-known textbook, Dr. Daniels has made excellent contribution to the literature of physical chemistry designed for the use of students, both young and old, in this rapidly changing field of knowledge.

In general the arrangement is similar to the older editions. The chapters on Elementary Thermodynamics, Kinetics, Photochemistry and Atomic Structure have been rewritten and chapters on Chemical Thermodynamics, using the notation of G. N. Lewis, and Introduction to Quantum Theory have been added.

The method of presentation is particularly fortunate, in that the language is non-technical in so far as possible. Models, mechanisms and analogies with common phenomena and concrete examples are freely employed in explaining the mathematically expressed physical laws, which in their written form are all too frequently but hieroglyphics to the student with a non-mathematical mind. The logical presentation and frequent references to earlier passages in the book add much to its instructive value and its readability. A suggestion from a prejudiced critic would call for the further revision of the chapter on gases, introducing a few paragraphs dealing with the great mass of recently acquired knowledge of high pressure gas phenomena, and the uses and limitations of equations of state.

The authors and the publishers are to be congratulated for the production of this attractive and valuable book.

EDWARD P. BARTLETT

Leitfähigkeit und Überführungszahlen in flüssigen und festen Elektrolyten. (Conductivity and Transference Numbers in Liquid and Solid Electrolytes.) Vol. XII of the "Handbuch der Experimental Physik," "Electrochemistry," Edited by K. FAJANS. Part 1, by Dr. L. EBERT and Dr. C. TUBANDT. Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 6, Leipzig C 1, Germany, 1932. xvi + 495 pp. 138 figs. 17.5 × 25 cm. Price, M. 43; bound, M. 45.

This book is the first half of a new treatise on electrochemistry by several authors under the editorial supervision of Fajans. It forms a part of the "Handbuch der Experimentalphysik." The volume at hand covers Conductivity in Liquid Electrolytes, Transference Numbers in Liquid Electrolytes (by L. Ebert) and Conductivity and Transference Numbers in Solid Electrolytes (by C. Tubandt). Another volume dealing with other branches of electrochemistry by other authors is promised in the near future.

To write a really modern treatise on electrochemistry at the present time is a difficult task because the great bulk of the literature was written from the point of view of the Arrhenius theory. Although the main emphasis

is properly placed on the experimental methods, facts and laws, rather than on theories, Ebert has shown extraordinary skill in selecting the portions of the older literature of permanent value and reinterpreting them from the point of view of the Debye-Hückel theory. The detailed mathematics of this theory is generally omitted but the fundamental premises are clearly stated, and the final equations given and discussed. The book should be helpful to many chemical students who find the mathematical style of the original literature a serious obstacle.

The portion of the book by Tubandt dealing with solid electrolytes describes clearly and interestingly a field which has been unduly neglected by American electrochemists.

Although the authors have purposely avoided giving a complete bibliographic guide to the literature of electrochemistry, there are numerous citations of the original articles which have been selected with good judgment. The book is written with Teutonic thoroughness and system and is clearly the best and most up-to-date treatise on the portions of the science which it covers.

GRINNELL JONES

An Introduction to Organic Chemistry. By ALEXANDER LOWY, Ph.D., Professor of Organic Chemistry, University of Pittsburgh, and BENJAMIN HARROW, Ph.D., Assistant Professor of Chemistry, College of the City of New York. Third edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York, 1932. xiv + 412 pp. 15.5 × 23.5 cm. Price, \$3.00.

The arrangement, the order of presentation and the type of the material in the third edition of this text follow closely that of the first edition, a more extended review of which was published in *THIS JOURNAL*, 47, 900 (1925). The authors have succeeded in bringing the book up to date by the inclusion of many of the recent advances made in organic chemistry, as, for instance, in ethylene chemistry, products from vinylacetylene, sugar structures, etc.

The text has been edited well, and it is relatively free from errors. The reviewer doubts, however, if the production of oxalic acid from sawdust would be considered a present-day commercial process (p. 92). The formula for muscarine (p. 110) as the aldehyde of betaine is, without doubt, wrong. It would seem, too, that if the cleansing action of soap is discussed at all, a more adequate explanation should be given. The authors have retained the section on the Electron Conception of Valence that appeared in the first edition. Since this is based on the speculation of the period of 1910 to 1916, it is fortunate that no attempt has been made to apply the ideas in the presentation of the material.

The clear statement of fact and the generous use of structural formulas give a good basis for the popularity of this text.

R. R. RENSHAW

Quantitative analytische Mikromethoden der organischen Chemie in vergleichender Darstellung. (Quantitative Analytical Micro Methods in Organic Chemistry. A Comparative Review.) By C. WEYGAND, Professor of Chemistry at the University of Leipzig. Akademische Verlagsgesellschaft m. b. H., Schlossgasse 9, Leipzig C 1, Germany, 1931. xi + 279 pp. 79 figs. 16 × 23.5 cm. Price, M. 16; bound, M. 18.

This book is a valuable contribution to the literature of micro-analytical methods of organic chemistry. In addition to the elegant micro methods which have resulted from the brilliant work of Professor Pregl and his associates at Graz, a number of less familiar micro and semi-micro methods are included.

As would be expected, the major portion of the book is devoted to Pregl's micro methods. In spite of the fact that Professor Pregl's book describing these methods is exceedingly well written, it is perhaps desirable to incorporate into these methods the experience of still another laboratory. This portion of the book will be particularly appreciated by those who do not have the opportunity to learn these methods from someone already familiar with them.

The book has been carefully edited, but perhaps it should be noted that the use of sodium hydroxide for the absorption of carbon dioxide in the semi-micro method described on page 130 is not in agreement with the directions published in the reference cited.

W. M. LAUER

Die hochmolekularen organischen Verbindungen—Kautschuk und Cellulose. (High Molecular Organic Compounds—Rubber and Cellulose.) By HERMANN STAUDINGER, Dr. Phil., Professor and Director of the Chemical Laboratories of the University of Freiburg. Verlag von Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany, 1932. xv + 540 pp. 113 figs. 17.5 × 26 cm. Price, RM. 49.60; bound, RM. 52.

It has for some time been increasingly evident that current scientific journals were becoming inadequate to satisfy Professor Staudinger's copiousness as an expositor of his own researches and speculations. The problem thus raised is solved by the book under review where, untrammelled by editorial restrictions, the author succeeds in bringing the record of his views and experimental accomplishments up to date.

In his preface Professor Staudinger states that the plan was initially to reprint all of his previous publications in this field together with numerous new researches, but the circumstances of the times prevented the realization of this plan; and so in the present work we have the 63rd, 64th, 65th, 66th, 67th, 68th and 69th numbered communications on high polymers, and the 38th and 39th in the series labeled isoprene and rubber. All of these are based largely on new experimental material and they bring further information concerning polystyrene, polyoxymethylene, polyethylene oxide,

polyacrylic acid, rubber and balata, and cellulose. Besides this the 11th communication on isoprene and rubber is reprinted (from *Kautschuk*, 1925) for its historical value together with fresh and renovated footnotes.

The first 156 pages of the book will be of most value to the general reader since they contain a general exposition of the properties and structure of high polymers. Unfortunately, this exposition is not as concise or as well-proportioned and organized as it might be. It is in parts unnecessarily repetitious. Abandoned views of erstwhile opponents are again set forth and again re-demolished; but aside from this the contributions of other investigators are, by comparison, rather inadequately recognized. The author is inclined to be dogmatic concerning certain speculative points of interpretation where, in fact, only slender and dubious evidence is available (*e. g.*, on pp. 73 and 293 in the interpretation of the viscosity behavior of polyethylene oxides, and on p. 115 concerning the structure of balata).

It is to be hoped, however, that these comparatively minor defects and the rather excessive profusion and prolixity of Staudinger's writings will not conceal from the reader the genuine importance of Staudinger's contributions to the knowledge of macromolecular materials. There are doubtless some points on which his views will prove to be wrong, but in the main he has been consistently right even during the great revival of speculative confusion from 1924-1929 when many European writers abandoned the fundamental ideas of orthodox organic chemistry in their attempts to deal with rubber, polysaccharides and proteins. By synthetic reactions of polymerization Staudinger provided giant molecules of relatively simple structure; he demonstrated the general structural plan of these molecules and furnished the first actual experimental material on the relation between properties and structure of linear macromolecules. The extent to which the subject of molecular colloids was clarified by Staudinger on the basis of this material is perhaps not yet generally appreciated; but there is no question that his contributions have been very important factors in the progress lately made on the structure of rubber and cellulose. They are likely to be equally significant in connection with future developments in proteins.

The most important new material in the book under review is concerned with measurements of viscosities. Staudinger's attempts to estimate molecular weights by this method have been greeted with much skepticism. He now presents a great mass of data all tending to demonstrate, in so far as it is possible to infer from the mere fact of self-consistency, that there is a simple and direct relation between the molecular weight of linear molecules and their "specific viscosities" in sufficiently dilute solutions. More astonishing is the fact that, within certain limits, the viscosity at a given concentration is determined only by the length of the polymeric chain and is practically unaffected by the presence of substituent groups or by the

presence of unsaturations or other atoms than carbon in the chain (but *ad hoc* assumptions are required to bring some materials in line with this conclusion). The author states repeatedly and emphatically (*e. g.*, pp. 79, 80, 83 and 244) that linear molecules in solution are rigidly extended, but on page 130 he admits that they may bend. He no longer considers that long molecules bear free valences at the ends, or that they are rings. They are open chains with terminal groups.

The chemistry of macromolecular materials is still in its infancy and although its growth during the past few years has been exceedingly rapid, some time must elapse before its theories are firmly enough grounded to permit the writing of a generally satisfactory textbook. Meanwhile everyone interested in this field must have access to Professor Staudinger's book. Chemists generally who seek new, fresh, and spacious fields will find it a rich source of provoking suggestions for thought and investigation.

The book is beautifully printed. At the end there is a bibliography of Staudinger's papers and a subject index.

WALLACE H. CAROTHERS

Die Vitamine nebst einer Einleitung über chemische Dynamik biologischer Vorgänge.
(The Vitamins, with an Introduction to the Chemical Dynamics of Biological Processes.) By ADOLF JOLLES. Verlagsbuchhandlung Franz Deuticke, Wien, Austria, 1932. 157 pp. Price, M. 10.

As the preface of this monograph states, this review of the vitamins aims to present a general picture of the subject rather than to discuss it from the standpoint of the special investigator in this field of nutrition. The author has succeeded in his object and has shown a good grasp of the subject as well as a knowledge of the voluminous literature. The first fifty pages are concerned with a consideration of the ferments and at the end the various hormones of the endocrines as well as the value of a vegetarian diet are discussed. The pamphlet is one of a series dealing with the scientific basis of nutrition.

ALFRED F. HESS