
 NEW BOOKS

Les Caroténoïdes des Animaux. (Animal Carotenoids).

By EDGAR LEDERER. Hermann et Cie., Éditeurs, 6 Rue de la Sorbonne, Paris, France. 62 pp. 17 × 25.5 cm. Fr. 15.

This supplements the author's "Les Caroténoïdes des Plantes," which appeared last year, and resembles it in format, style, typography, etc. In the former volume, the classification of the subject matter was primarily chemical. In the present one, it is zoological. Its four chapters discuss (I) Carotenoids of the vertebrates, (II) Carotenoids of the invertebrates, (III) Specific animal carotenoids (asteric and salmenic acids, actinioerythrin, astacin, glycymerin and pectenoxanthin), and (IV) biochemical and biological questions.

The author pays a graceful and well-merited tribute to Palmer's classical book on "Carotinoids and Related Pigments" (Am. Chem. Soc. Monograph Series, Chemical Catalog Co., Inc., New York City, 1922), which he says that he is endeavoring to bring more nearly up to date for the animal carotenoids.

Thanks to the labors of Willstätter, Karrer, Kuhn, Von Euler, Zechmeister and their associates, the chemistry of the phytocarotenoids has been remarkably elucidated within the last year or two. Our knowledge, however, of those carotenoids which are peculiar to the animal kingdom is still meager and often but superficial. In addition to the researches of Karrer, Kuhn and von Euler, Lederer, Lönnberg and Willstaedt have made valuable contributions in this group.

The carotenoids which are peculiar to animals are found chiefly in the invertebrates. Those occurring in the vertebrates are generally only the phytocarotenoids ingested with the food. An admirable résumé is presented of the occurrence of the carotenoids in animals, how various groups of vertebrates differ in the particular carotenoids they store, where they store them and the role they play in the living organism.

The few polyene pigments peculiar to animals are described in detail, together with information as to where they are found in the invertebrates and their possible function there.

The book should be of especial value to those interested in the biological and biochemical problems of the carotenoid field.

MARSTON TAYLOR BOGERT

The Structure and Composition of Foods. Volume II. Vegetables, Legumes, Fruits. By ANDREW L. WINTON, Ph.D., and KATE BARBER WINTON, Ph.D. John Wiley and Sons, Inc., 440 Fourth Ave., New York, 1935. xiv + 904 pp. 303 figs. 15.5 × 24 cm. Price, \$15.00.

This is the second volume in the series that is being written and illustrated by these authors, the first volume having appeared in 1932. The second volume is divided into two major parts, I, Vegetables, and II, Fruits. Part I is further subdivided into the sections: mushrooms; root

vegetables; tuber, corm and rhizome vegetables; leaf and stem vegetables; flower vegetables; and fruit and seed vegetables. In each of these sections the material is arranged by botanical families, and under these, in turn, by genera and species. Part II, Fruits, is also arranged by families, some thirty-five being listed in the table of contents.

An introduction of twenty-four pages has been included, which contains a discussion of the chemical constitution of the principal constituents of vegetables and fruits including proteins, acids, carbohydrates, pectins, pigments and vitamins. In view of the rapid progress that is now being made in the chemistry of these substances, this portion of the book may be out of date long before the remainder has ceased to be a wholly satisfactory source of data.

The Wintons have followed much the same general plan of organization in this volume as in the earlier book. Common and botanical names head each subdivision followed by common names in several foreign languages. Usually a brief historical treatment of the origins and uses of the food in question is followed by a discussion of its macroscopic and microscopic structure. Over 300 figures have been included in this connection. These are the authors' original work, and most of them are here presented for the first time.

Then follows in each case a discussion of the chemical composition of the food. This includes not only the conventional proximate analysis, but in addition, specific constituents are often listed, described and the percentages present (when known) are recorded. In the instance of certain of the more common and important foods, the changes in composition during growth, storage and processing are also included.

The book is a veritable storehouse of useful facts, gathered by a thorough combing of the literature. Many of the latest papers, published during the present calendar year, have been consulted and mentioned in the text, which is thus up to date. The material is rendered the more useful and available by an extensive index which includes common and botanical names of the foods, foreign names and constituents.

C. H. BAILEY

Autenrieth-Rojahn, Qualitative chemische Analyse. (Autenrieth-Rojahn, Qualitative Chemical Analysis.) By Dr. C. A. ROJAHN, Martin Luther University, Halle-Wittenberg. Third, revised edition. Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany, 1935. vii + 233 pp. 12 figs. 16 × 24 cm. Price, RM. 10.

This book has three parts: (I) A Systematic Scheme of Analysis; (II) Reactions of Cations and Anions, and (III) General Part (Theoretical Chemistry).

Part I (67 pages) contains a brief discussion of various types of tests useful in Qualitative Analysis. This general discussion is followed by an outline giving a scheme for the

systematic separation of the cations. Mercury falls in the copper group and magnesium with the alkali metals. Superscripts refer to subsequent notes on the reactions and procedures.

Part II (90 pages) gives a selected group of reactions for each ion. The style of presentation is similar to the corresponding part of the well-known text by Treadwell and Hall.

Part III (90 pages) gives in very brief and concise form a review of the entire field of inorganic chemistry. A few of the topics included in this review are: atomic theory, Prout's theory, atomic structure, gas laws, heat of fusion, osmosis, electrolytic dissociation, hydrolysis, thermochemistry, equilibrium constants, catalysis, double salts, complex ions, Werner's theory, stereochemistry of complex compounds. Colloid chemistry, oxidation and reduction, and oxidizing and reducing agents, are put under separate headings following the general review.

C. R. CONARD

Gmelin's Handbuch der anorganischen Chemie. (**Gmelin's Handbook of Inorganic Chemistry.**) Edited by R. J. MEYER. Eighth edition. System-Number 53, **Molybdenum.** Issued by the Deutsche Chemische Gesellschaft. Verlag Chemie, G. m. b. H., Corneliusstrasse 3, Berlin W 9, Germany, 1935. 393 pp. 17 × 25 cm. Price, RM. 64.

This volume recounts the physical properties and the chemical behavior of elementary molybdenum and of the compounds of molybdenum with other elements of smaller "system-numbers." This includes all the non-metals, chromium and all the metals of the 0 to 5th group of the Periodic Table other than copper, silver and gold.

Molybdenum has in recent years become an important industrial metal and the up-to-date information which this volume affords particularly as regards its physical properties and the complex compounds of molybdic acid is especially welcome.

The collaborators with the Editor, R. J. Meyer, in the preparation of this volume, which appears to maintain the high standards of its predecessors, were Ellen Schön, Emma Haller, Max du Maire, Gertrud Pietsch-Wilke, Karl Becker, Ortwin von Deines. The literature has been covered through 1934.

ARTHUR B. LAMB

Toxikologische Mikroanalyse. **Qualitative Mikrochemie der Gifte u. a. gerichtlich-chemisch wichtiger Stoffe.** (**Qualitative Microchemistry of Poisons and Other Compounds of Medico-legal Importance.**) By Dr. L. ROSENTHALER, Professor at the University of Berne. Verlag von Gebrüder Borntraeger, Schöneberger Ufer 12a, Berlin W 35, Germany, 1935. viii + 368 pp. 173 figs. 16.5 × 25.5 cm. Price, RM. 25.50; bound, RM. 28.

The term poison is usually applied to substances which are injurious in comparatively small doses. The toxicologist must, therefore, often work with very small amounts of material and his results are qualitative rather than quantitative. The present volume treats of poisons only from the qualitative standpoint.

Microsublimation, microdistillation and microextraction, important procedures in detecting small amounts of poisons, are discussed in detail.

Seventy-six pages are devoted to inorganic poisons: chlorine in water, chlorates, bromine, fluorides, nitrites, phosphorus, hydrogen sulfide, selenium compounds, carbon monoxide, arsenic and antimony compounds, ammonia in the air, lead (Fairhall's methods) in blood, urine and various organs; copper, manganese, mercury, thallium, bismuth, etc.

One hundred and twenty-seven pages are devoted to non-alkaloidal organic poisons: methanol and ethanol (including Gettler's methods), aldehydes, phenols, organic acids and their esters, cyanogen compounds; halogen derivatives ("Avertin," chloral hydrate, etc.); thyroxin; barbiturates (fourteen pages), anilin derivatives, saccharin, organic arsenic derivatives (arsphenamine, etc.).

One hundred and twenty-one pages are devoted to alkaloids, glucosides and similar compounds.

Methods for the detection of blood and semen are also discussed.

There are 170 excellent figures of crystals.

REID HUNT

Neuere massanalytische Methoden. (**New Methods of Volumetric Analysis.**) By Dr. E. BRENNER, Prof. Dr. K. FAJANS, Prof. Dr. N. H. FURMAN and Priv.-Doz. Dr. R. LANG. Foreword by Prof. Dr. W. Böttger. Ferdinand Enke Verlag, Hasenbergsteige 3, Stuttgart-W, Germany, 1935. xi + 211 pp. 15 figs. 16.5 × 25 cm. Price, RM. 18; bound, RM. 19.80.

This publication is the 33rd volume in the series of monographs on Analytical Chemistry founded by B. M. Margosches. The present volume was edited by Wilhelm Böttger and contains six sections. These cover some of the more recent activities in analytical chemistry, each chapter being the work of a specialist in the field under discussion.

Chapter I (19 pages) on the Elimination of Titration Errors in Acid and Alkali Titrations, Chapter IV (21 pages) on Chromous Solutions as Reducing Agents in Volumetric Analysis, and Chapter V (44 pages) on Oxidation-Reduction Indicators were prepared by Erna Brennecke.

Chapter II (23 pages) on Ceric Sulphate as an Oxidation Agent in Volumetric Analysis is the work of N. Howell Furman.

Chapter III (52 pages) on Iodate and Bromate Methods and Bromometric Titrations According to Manchot are presented by Rudolf Lang, and Chapter VI (47 pages) on Adsorption Indicators in Precipitation Titrations was written by K. Fajans.

The monograph has been especially prepared for the purpose of inducing a wider appreciation of these methods, and of their applications in analytical chemistry. This aim has been well met, and the monograph should appeal to all analysts who desire concise summaries of the information that is available to date on the subjects that are covered, or who wish to consider possible applications of the methods in the fields of analysis in which they are working.

G. E. F. LUNDELL

Einführung in die Lehre von den Kolloiden. (Introduction to the Study of Colloids.) Edited by Prof. Dr. H. BECHHOLD, Frankfurt a. M. Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany, 1934. vii + 160 pp. 86 figs. 16 × 23.5 cm. Price, RM. 9; bound, RM. 10.

This introductory text of about 150 pages constitutes a novelty in colloid literature, because separate chapters are written by seven different authorities from three countries. It records in revised form a series of lectures given under Bechhold's auspices at the Institute of Colloid Research, Frankfurt a. M., before a general audience.

Instructors in this subject will read the book with curiosity to see what is considered worthy of mention in this brief treatment, and also to observe the attitude taken by the writers toward important questions.

The chapters include an Introduction by Bechhold, preparations by Schwarz, kinetic theory by Hock, surface phenomena by Heymann, properties other than electrical or optical by Hock, electrical properties by Heymann, separation and purification by Erbe, optical properties by Hauser and x-ray results by Brill. An author and a subject index are provided and there are a few references to journal literature. Most of the chapters end with a list of books dealing with the subject. These are mostly (and naturally), but not all, in the same language as the introductory text itself. This book is a valuable and thoroughly modern addition to any colloid library.

JAMES W. MCBAIN

Inorganic Colloid Chemistry. Volume II. By HARRY B. WEISER, Professor of Physical Chemistry at the Rice Institute. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, 1935. xi + 429 pp. 70 figs. 15.15 × 23.5 cm. Price, \$4.75.

The first volume of this Treatise dealing with The Colloidal Elements was reviewed last year (Vol. 56, p. 1254). This second volume supersedes the author's well-known "The Hydrous Oxides" of ten years ago, which has been rewritten and completely revised for the purpose. Professor Weiser is not only producing a readable and authoritative treatise on inorganic colloid chemistry by making a comprehensive survey of the materials in this field, but he is furthering the advance of the subject itself by his clear and critical review of relevant theory and its applications.

The author appears justified in his hope that it will prove useful as a reference work alike to those interested in pure science and those concerned with its industrial applications, and as a text for the study of colloidal phenomena in their relation to this class of inorganic compounds.

JAMES W. MCBAIN

A Course in Inorganic Preparations. By WILLIAM EDWARDS HENDERSON, Professor of Inorganic Chemistry, and W. CONARD FERNELIUS, Assistant Professor of Inorganic Chemistry, The Ohio State University. McGraw-Hill Book Company, Inc., 330 West 42d Street, New York City, 1935. xviii + 188 pp. 24 figs. 14 × 21 cm. Price, \$2.50.

This book is intended as a laboratory text for advanced and graduate students of chemistry. In it is described the

preparation of over a hundred inorganic compounds, which require the use of fairly simple apparatus and readily obtainable chemicals. In part I (55 pages) the preparations are classified according to the method to be employed; such as crystallization, distillation, electrolytic and others. Part II (97 pages) is concerned with the preparation of types of compounds; for example, binary, intermetallic, oxyacidic, thio salt, oxychloride, to mention only a few. Finally part III goes into the subject of colloids, and after describing preparations illustrating general methods, such things as gels, rhythmic bands and emulsions are taken up with three or more examples of each. In all cases the experimental procedures are described clearly and in some detail. At the end of each exercise are given helpful references to easily available Journals and books, especially those in English. No problems or questions are given, and the amount of theory included is small.

The exercises in part I illustrating general methods are, on the whole, well chosen. The classification of preparations in part II according to types of compounds has its advantages, and certainly the student must learn what the known types are, at some stage or other. But this classification is easily understood and would come more naturally in an elementary course. It seems to us that a classification according to types of reactions, or the rows or groups in the periodic system would be more instructive. The latter would lead to a more extensive knowledge of the chemistry of all the elements, as well as pave the way for the introduction of the elements of atomic and molecular structure. In the former it is natural to emphasize equilibria and thermodynamics. It is true that the body of chemical facts included in the book is considerable, and this is highly desirable; but the principles set forth are few and seem too elementary for advanced students.

It is probably true that freshmen and sophomores find a course in preparations helpful and even stimulating, but when they become juniors, seniors or graduates it is high time for them to realize that the unknown things in chemistry far outnumber the known. Accordingly, at this stage they could be given experimental problems which would lead to the discovery of something new, or would result in providing numerical data of interest and importance. The preparation of the substances needed for the problems would give the knowledge and technique which the experiments in the book under review aim to give. The book might well serve as a handy guide for the preparation of the required substances. But as such, and even for the purposes of a more routine course for advanced students, the number of preparations should be increased and greater variety introduced. As it now stands crystallization and precipitation methods are over-emphasized in the book.

We didn't look for errors in printing. Errors in fact and reasoning are few. The first sentence in the first new paragraph on page 5 is confusing and lacks content. In the last paragraph but one, on page 144, a roughly correct conclusion is drawn, but the thermodynamic reasoning used is wrong.

Our views on advanced courses being what they are, we can hardly recommend the book as a text for more advanced and graduate students. For a course in inorganic preparations of the conventional type, it should prove quite satisfactory. It would also serve as a very useful

reference book in courses conducted along somewhat different lines.

DON M. YOST

Die organischen Katalysatoren und ihre Beziehungen zu den Fermenten. (Organic Catalysts and their Relation to Enzymes.) By Dr. WOLFGANG LANGENBECK, Professor at the University of Greifswald. Verlag Julius Springer, Linkstrasse 23-24, Berlin W. 9, Germany. 112 pp. 6 figs. 16.5 × 24.5 cm. Price, RM. 7.50.

Enzymes, in the past, have been considered as "vital forces," as "active colloids," or as a new and unknown class of chemical compounds, and have only recently been shown to belong to the general class of proteins. Since the enzymes possess very marked properties not exhibited by other proteins they must possess special chemical structure. What this structure is remains to be determined. Professor Langenbeck points out that there are, in general, two methods of determining structure—degradation into known compounds, and synthesis of compounds of known structure having the same properties as other enzymes. The latter method is that chosen by Professor Langenbeck and the present volume summarizes the results of his work.

The author evidently considers enzymes as examples of homogeneous catalysis and his models thus differ from earlier ones, such as Bredig's, which were colloidal.

The guiding principle has been to start with a compound having slight catalytic activity and to form a series of substituted derivatives. These derivatives having higher activity than the original compound were then further substituted. In this way the activity has been increased in a remarkable way so that, in the case of carboxylase models, the most active substitution product was 4000 times as active as the original compound, methyl amine. The activity of this "synthetic enzyme" is of the same order of magnitude as that of crystalline pepsin. Heavy metal catalysis concerned with oxydase and catalase activity, the catalytic activity of hemin, dehydration of amino acids, and carboxylases have been studied in this way.

The group considered to be responsible for the activity is defined as that group which reacts directly with the substrate. This definition is useful and, in the case of the models, quite definite although in the case of enzymes there is, as yet, no conclusive evidence of such a direct reaction between enzyme and substrate. Substituted groups which affect the "active group" are called "activating" groups. This is also a useful term although, strictly speaking, all atoms in the molecule must affect the activity to some extent.

Theoretically, it should eventually be possible to predict in advance what the effect of any given group should be, just as it is now possible to make predictions as to the effect of substitution on the color of dyes. This will require the preparation of a very large series of derivatives, as Professor Langenbeck clearly realizes. Such a series of compounds should be of the greatest importance for the elucidation of the general theory of homogeneous catalysis as well as for the special case of enzymes.

A study of the reaction kinetics of these models has led to a very interesting equation for enzyme reactions which has the same form as the well-known Michaelis and Menten equation. It differs from the latter in that the reaction between enzyme and substrate (in hydrolytic reactions) is assumed to give rise at once to one of the products, while the enzyme remains combined with the other reaction product. This complex then breaks down, liberating the enzyme.

The book contains detailed description of laboratory technique, as well as the theoretical results, and is a decided addition to the literature of catalysis in general and enzymes in particular.

JOHN H. NORTHROP

BOOKS RECEIVED

September 15, 1935–October 15, 1935

HENRY B. BULL. "The Biochemistry of the Lipids." Burgess Publishing Company, 426 South Sixth St., Minneapolis, Minn. 127 pp. \$3.25.

HORACE G. DEMING AND SAUL B. ARENSON. "Exercises in General Chemistry and Qualitative Analysis." Fourth edition, rewritten and revised. John Wiley and Sons, Inc., 440 Fourth Ave., New York. 326 pp. \$1.80.

WILLIAM T. HALL. "Treadwell-Hall Analytical Chemistry. Vol. II. Quantitative Analysis." Eighth edition. John Wiley and Sons, Inc., 440 Fourth Ave., New York. 858 pp. \$6.00.

CARL OPPENHEIMER. "Die Fermente und ihre Wirkungen." Supplement, Lieferung 1. W. Junk Verlag, Scheveningsche Weg 74, The Hague, Holland. 160 pp. \$6.80.

WOLFGANG OSTWALD. "Metastrukturen der Materie." Sonderausgabe aus den *Kolloid-Beiheften*. Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany. 16 pp. RM. 0.80.

W. A. ROTH AND K. SCHEEL. "Landolt-Börnstein Physikalisch-chemische Tabellen." Fünfte umgearbeitete und vermehrte Auflage. Dritten Ergänzungsband, erster Teil. Verlag von Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany. 734 pp. RM. 81.

JULIUS RUSKA, Editor. "Das Buch der Alaune und Salze." Verlag Chemie, G. m. b. H., Corneliusstrasse 3, Berlin W 35, Germany. 126 pp. RM. 15.

WILLIAM A. WATERS. "Physical Aspects of Organic Chemistry." George Routledge & Sons, Ltd., Broadway House, 68-74 Carter Lane, Ludgate Hill, London E. C. 4, England. 501 pp. 25s./-.

ARNOLD WEISSBERGER AND ERICH PROSKAUER. "Organic Solvents. Physical Constants and Methods of Purification." Translated from the German by Randal G. A. New. Oxford University Press, 114 Fifth Ave., New York. 212 pp. \$5.00.