

NEW BOOKS

Eminent American Chemists. A Collection of Portraits of Eminent Americans in the Field of Chemistry from the Earliest Days of the Republic to the Present, together with Short Sketches of the Work of Each. Compiled and edited by D. H. KILLEFFER, Associate Editor, Industrial and Engineering Chemistry; Secretary, New York Section of the American Chemical Society. Published by D. H. Killeffer, 19 East 24th Street, New York City, 1924. iii + 33 pp. 33 portraits. 26.5 × 21 cm. Price \$6.00.

The title of this book is self-explanatory. The compiler has made a careful selection of thirty-three representative American chemists who are especially deserving of the eminence that science and time have accorded them. The format is large enough to permit portraits of ample size, and the mechanical construction is such that any portrait may be removed for framing or for photographing.

The list is as follows: Joseph Priestley; Benjamin Thompson, Count Rumford; Benjamin Silliman; Robert Hare; James Curtis Booth; John Lawrence Smith; Oliver Wolcott Gibbs; Thomas Sterry Hunt; Josiah Parsons Cooke; John William Mallet; Charles Frederick Chandler; Edward Williams Morley; Josiah Willard Gibbs; Harvey Washington Wiley; Ira Remsen; Frank Wigglesworth Clarke; William Francis Hillebrand; Edgar Fahs Smith; Russell Henry Chittenden; William Albert Noyes; Edward Curtis Franklin; Leo Hendrik Baekeland; Arthur Amos Noyes; Moses Gomberg; Julius Oscar Stieglitz; Wilder Dwight Bancroft; Theodore William Richards; Willis Rodney Whitney; Bertram Borden Boltwood; Gilbert Newton Lewis; Frederick Gardner Cottrell; Irving Langmuir; Donald Dexter Van Slyke.

Noteworthy about the book is the literary style of the short sketches of scientific achievements which accompany the portraits. These are striking, yet repressed, terse, admirably phrased.

If the chemists of the present and those to come can yield their proportionate share of creative effort and of influence in the community, we need not doubt for the future of chemistry in America, nor for the influence of American Chemistry in the world.

WILLIS A. BOUGHTON

Kapillarchemie. Eine Darstellung der Chemie der Kolloide und verwandter Gebiete. (Capillary Chemistry. A Presentation of Colloid Chemistry and Allied Subjects.) By Prof. Dr. HERBERT FREUNDLICH. Third, enlarged edition. Akademische Verlagsgesellschaft m. b. H., Markgrafenstr. 4, Leipzig, 1923. xv + 1225 pp. 157 figs. 24.5 × 16.5 cm. Price unbound, Gold marks 30; bound, 32.50.

This edition is an anastatic reprint of the last (second) edition, to which have been added 43 pages of supplementary notes, covering the more important developments in the field during the years 1921 to 1923. Each note is referred to its appropriate page in the main body of the book.

This remarkably instructive, comprehensive and stimulating volume thus becomes even more useful, and indeed necessary, to the investigator, teacher and student of colloid chemistry.

ARTHUR B. LAMB

Spektroskopie der Röntgenstrahlen. (Spectroscopy of X-Rays.) By Dr. MANNE SIEGBAHN, Professor at the University of Upsala. Julius Springer, Berlin, 1924. vi + 257 pp. 119 figs. 24.5×16.5 cm. Price, unbound, \$3.60; bound, \$3.85.

The scant literature in the form of convenient and authoritative monographs, presenting the great science of X-rays in its various phases and applications, and recently greatly enriched by the excellent "Kristalle und Röntgenstrahlen" by P. P. Ewald, has again received a notable accretion in this work by the eminent Professor Siegbahn of the University of Upsala in Sweden. Ewald considered X-rays as a means to an end, namely, the determination of crystal structures; Siegbahn, on the other hand, considers the crystals as the means to an end, namely, the study of X-rays themselves spectroscopically. The devotee of science who possesses these two comparatively brief books with opposite points of view may be assured that he is as well equipped upon chemical and physical phases of the subject as it is possible to be at the present time. Publication of both in English speedily is greatly to be desired. What then are the attributes of the newer of these two contributions which commend it to thoughtful consideration?

In the first place this monograph is timely. The need for such a work has been generally and acutely felt because of the rapid advances in X-ray spectroscopy made possible by widely scattered original papers. Furthermore the subject matter is somehow so fundamental that an adequate understanding of it must of desirable necessity precede attempts to apply X-radiation in the fields of crystal structure analysis and röntgenology. Previously published treatises by Pohl, Kaye, the Braggs, Dauvillier and Ledoux-Lebard, deBroglie, and Cermak, while in themselves noteworthy contributions, are incomplete in their treatment or are completely out of date. Siegbahn presents the science in its 1924 aspects.

Second, the monograph is rigorously experimental and authoritative. This follows at once from the unsurpassed reputation of the author as an experimental investigator, who through the years has devised better spectrometers, accurate to less than $1''$ of arc, and with them determined X-ray wave lengths (particularly the longer and more difficultly measurable) which are *really* physical constants. It is generally agreed that in this field he stands with Professor Duane of Harvard preëminent. The book has, therefore, the solid background of experimental truth for which the author may vouch in a spirit of modesty which is ever the criterion of greatness. It may be safely predicted that when a painstaking experimentalist, with an intense devotion to his life work and with a breadth

of vision which appreciatively values other work, takes time to write a book, the product of such a keenly organized mind will be extremely worth while. So it is in this case; and we find, as a third characteristic, a concise clearness of expression and logic in arrangement of material, which inevitably result from explorations on the outskirts of a science intelligently directed from the body of knowledge already extant.

Of doubt or hesitation there is none, even though the science is far from finality. And yet, as a fourth attribute, must be cited the completeness of the presentation of the material now known. Professor Siegbahn acknowledges the omission of consideration of X-ray scattering and the very new researches on abnormal reflection and reflection by crystals of their own characteristic radiations. That he has presented every other phase of importance, including a masterly treatment of the best theory is shown by the chapter headings: a short review of our knowledge of X-rays prior to the discovery by Laue; interference of X-rays (the work of Laue and Bragg, together with a discussion of the inexactness of Bragg's law of reflection when rigorously tested by very refined measurements); the technique of X-ray spectroscopy (the best chapter by far ever written upon the subject, illustrated by numerous excellent diagrams and photographs of apparatus); emission spectra (with tables of the latest and most accurate wave-length values); absorption spectra (with a most interesting section upon the dependence of absorption upon the chemical binding of an element—a fact discovered only by most refined measurements in the author's laboratory); systematics and theories of X-ray spectra (energy levels, relativity doublets, latest work of Wentzel, Sommerfeld, Bohr and Coster, etc.); the continuous X-ray spectrum; other methods for the determination of the inner energy levels of the atom (β -ray spectra, photo-electric methods, bridging the gap between ultraviolet and X-rays, etc.). Convenient tables are appended on critical voltages for the excitation of characteristic spectra, absorption coefficients, and wave lengths of rays reflected at given angles by crystals of rock salt, calcite, quartz, gypsum and sugar. A bibliography of more than 400 references is arranged chronologically and alphabetically by author's name under each year. There is a name index but not a subject index. The latter omission does not prove serious because of the division of the text into numbered topics under each chapter and a complete paged table of contents. The book might easily have been expanded into one twice as long, but the convenient condensed form is entirely adequate for clear and complete presentation, even to the reader unfamiliar with the subject.

There are practically no typographical errors. The paper-backed volume is of so frail construction that the bound copies at a few cents extra are greatly to be preferred. It is distinctly pleasing to note that the price is only about half the rather exorbitant figure demanded by the German publisher for Ewald's monograph.

It may be safely stated that the reader will be enthusiastically impressed with Professor Siegbahn's presentation. One has the natural and unescapable feeling that the monograph is the last word on the subject at the present time. Genuine pleasure is always derived from owning a book so worth while, reading it through, and then in having it close by for leafing through at odd moments, if for no other reason than in appreciation of the fact that an expert in calm and discriminating wisdom has with almost perfect success welded together the very essence of more than 400 original papers with the skilful hand of a master investigator.

GEORGE L. CLARK

The Chemical Elements. By F. H. LORING. E. P. Dutton and Company, New York, 1924. viii + 171 pp. 4 figs. 23 X 15 cm. Price \$3.75.

This book is primarily a collection of various speculations of the author, most of them being connected in one way or another with the periodic system of the elements. About half of the work deals with a "place principle," the claim being made that (1) the periodic relations between the properties of the elements, (2) the numerical relations between the atomic numbers of missing elements (scandium being included with those missing, as it is much less abundant than the elements adjacent to it in the periodic table), (3) the stepwise relations between the X-ray spectra of the elements, (4) spectral series, (5) the octet-forming tendency of valence electrons, and (6) the regular arrangements of atoms in crystals, are all manifestations of this principle. In conjunction with the speculative matter, certain phases of the Bohr theory of the atom, the quantum theory, the theory of relativity, the "octet theory" of valence, the structure of crystals as determined by X-rays, radioactivity, and Aston's work on isotopes are considered. Quotations are numerous, especially from the author's previous writings.

Many of the arguments used in the book are quite unconvincing, especially those based on the series relationships supposed to exist between the differences between certain atomic numbers. Furthermore, the author has been rather careless in some cases in his statements of facts, as when he writes (pp. 67-68) that "the action of X-rays on entering crystalline matter is such that the rays. . . . penetrate to the nucleus of atoms, but when the X-ray reaches the particular atomic nucleus, the bull's eye of the target so to speak, it is reflected back at an angle equal to its angle of incidence." The explanation given (p. 68) for the elliptical shape of Laue spots is also incorrect; and further inaccuracies might be mentioned, if space permitted.

The author's style is very cumbersome, making the book hard to read understandingly, even though most of the subjects dealt with are familiar to the average chemist.

MAURICE L. HUGGINS

Jahrbuch der Organischen Chemie. X. Jahrgang: Die Forschungsergebnisse und Fortschritte im Jahre 1923. (Yearbook of Organic Chemistry. Research Results and Progress in the Year 1923.) By Professor Dr. JULIUS SCHMIDT, Stuttgart. Wissenschaftliche Verlagsgesellschaft M.B.H., Stuttgart, 1924. xvi + 284 pp. 25 × 16 cm. Price Goldmark 18, bound; 15.50, unbound.

After an interval of nearly ten years, during which the war and its aftermath prevented publication, the well-known *Jahrbuch* makes its reappearance as Volume X which gives an account of the development of organic chemistry during 1923. The author announces that the gap 1914-1922 will be filled by Volumes VIII and IX which are to be issued in the near future in order to complete the series.

The new volume is, in the main, modeled closely after the older ones both in the selection and the presentation of the material; but in recognition of the great interest in pharmaceutical and biological chemistry which has developed since the war, the author has paid much more attention than heretofore to these fields. Thus the literature on the relation between constitution and physiological action is reviewed with care and there are new chapters dealing with hormones, including insulin, and with enzymes. These chapters will be especially appreciated by organic chemists because the information is frequently drawn from sources that are not always readily accessible.

E. P. KOHLER

Emil Fischer. *Gesammelte Werke* herausgegeben von M. Bergmann. *Untersuchungen über Aminosäuren, Polypeptide und Proteine. II (1907-1919).* (The Collected Works of Emil Fischer, edited by M. Bergmann. Investigations upon Amino Acids, Polypeptides and Proteins.) Julius Springer, Linkstr. 23-24, Berlin W 9, 1924. ix + 922 pp. 24.5 × 16 cm. Price, unbound, \$7.00; bound, \$7.65. (Goldmark 29, unbound; 32, bound.)

Emil Fischer. *Gesammelte Werke* herausgegeben von M. Bergmann. *Untersuchungen aus verschiedenen Gebieten; Vorträge und Abhandlungen allgemeinen Inhalts.* (The Collected Works of Emil Fischer, edited by M. Bergmann. Investigations in Various Fields; Lectures and Publications of a General Nature.) Julius Springer, Linkstr. 23-24, Berlin W 9, 1924. x + 914 pp. 24.5 × 16 cm. Price, unbound, \$9.65; bound, \$10.00.

The first of these volumes is the second installment dealing with Fischer's investigations upon the amino acids, polypeptides and the proteins, covering the period of 1907 to 1919. It is fully as large as the first installment, comprising some 86 articles. The arrangement is the same: first, the syntheses of the single amino acids; second, their combination into many-membered polypeptide chains; and finally, the experiments on the splitting of the various polypeptides and proteins. In addition, there is the important series of articles on the Walden inversion.

Fischer published no articles on proteins later than 1916. The editor, Dr. Bergmann, points out that while this might seem as though Fischer

in his latest years had definitely abandoned work in this field, actually this was not the case. Fischer repeatedly expressed his intention of taking up the work on proteins again, by a new avenue of approach.

The second volume is the concluding one of the collection. It contains Fischer's miscellaneous contributions. They number 120, and cover a wide variety of subjects, though of course they are chiefly concerned with problems of organic chemistry. The articles on hypnotics will be particularly welcome, since the originals appeared in journals not readily accessible to chemists. The last 200 pages contain lectures and articles on general subjects, a tribute to Ramsay, and a number of obituaries of celebrated chemists, notably one of Pasteur.

These collected works of Emil Fischer will be an inspiration to every devotee of science. They make us realize not only the genius but also the virility and fecundity of Fischer's mind. Emil Fischer surely approximated very nearly the ideal investigator. His discoveries were not accidental. He selected broad problems of capital importance, and was not dismayed by their difficulty. He attacked them logically and aggressively. His success was indeed marvelous, and mankind owes him an incalculable debt of gratitude.

The carefulness of the editing and the dignified appearance of the volumes are commensurate with the importance of their contents.

ARTHUR B. LAMB

Gesammelte Abhandlungen von Dr. F. KEHRMANN (Professor at the University, Lausanne).

Vol. I. Part 1, Untersuchungen ueber komplexe anorganische Säuren. Part 2, Untersuchungen ueber sterische Hinderung. (Collected Works of Dr. F. Kehrman. Researches on Complex Inorganic Acids. Researches on Steric Hindrance.) Georg Thieme, Leipzig, 1922. viii + 203 pp. 17 × 25 cm. Price (outside Germany) unbound, \$1.70.

Vol. II. Part 1, Untersuchungen ueber Hydrochinone und Chinone. Part 2, Untersuchungen ueber Azine und Azoniumverbindungen. (Part 1, Researches on Hydroquinone and Quinone. Part 2, Researches on Azines and Azonium Compounds.) Georg Thieme, Leipzig, 1923. viii + 599 + 2 appendices of 8 and 9 pp., respectively. 17 × 25 cm. Price (outside Germany) unbound, Swiss Fr. 16.

In these two volumes Kehrman has collected all the papers published by him and his collaborators between 1887 and 1922. The papers are reprinted verbatim but the order is different from that in which they originally appeared; for the convenience of the reader they have been classified, somewhat arbitrarily, under the subjects that form the titles of the four sections of the collection.

The first section contains the papers on complex inorganic acids, the subject with which Kehrman began his career as a youth of seventeen, and to which he returned again and again long after his major interest lay elsewhere. It deals largely with complex tungstic acids.

In the second part of the first volume Kehrman has grouped together a series of papers which, although dealing mainly with quinones, have a special interest in connection with the stereo-isomerism of quinone oximes and the phenomenon now known as "steric hindrance." From the introduction to this section it is apparent that Kehrman feels that his contributions to this subject are not always adequately recognized. Whether this be so or not, the orderly sequence of papers makes it easier to understand how the youthful investigator, starting with a chance observation rapidly evolved ideas on the hindrance that groups in the *ortho* position exercise "by reason of their mass," which enabled him not only to predict with certainty in his own field but also to account for the results of others.

The second volume contains the papers on hydroquinones, quinones, azines, and azonium compounds—a field in which the author started to work for his doctor's dissertation under the guidance of Nietzki and which he has tilled with unusual devotion and success ever since. Here we find, in a setting that shows their genesis, Kehrman's views on the relation between color and constitution, and between the structure of hydroquinones and their tendency to form quinones; his proof of the structure of the indulin and of the desmotropism of oxyazines and safranines; his discovery of amino derivatives of benzoquinone, of phenyl-phenazonium, and of amphiquinoidal derivatives of quinone-imide dyes; and many other subjects of theoretical and practical importance. Excellent indexes both of authors and subjects add much to the value of the collection.

E. P. KOHLER

Die Düngerlehre (The Science of Fertilizers). By ADOLF MAYER. Seventh edition. Carl Winters, Heidelberg, 1924. viii + 271 pp. 24 × 16 cm. Price bound, mk. 9.

Die Düngerlehre constitutes the seventh edition of a small book which is the second part of the second volume of Adolf Mayer's well-known "Lehrbuch der Agrikulturchemie." This new edition of *Die Düngerlehre* contains sections on the following subjects: Fertilization in General, Stable Manures, Human Excreta as Manures, Other Agricultural Organic Manures, Commercial Fertilizers of the Artificial Type, Mixed Fertilizers and Natural Mineral Fertilizers, Indirect Fertilizers, Experiments with Fertilizers of all Kinds, and the General Significance of Fertilizers in Husbandry.

The book makes no new contributions to the subject over that furnished in earlier editions. Being based as it is on the established notion that nitrogen, phosphorus, and potassium are elements of chief moment in the whole question of fertilizers and fertilization, it is so far behind the views of soil science today as to be of no practical utility to those who seek explanations for the real difficulties connected with the management of soil, looking toward the increase or even the maintenance of fertility.

Coming as it does in the third decade of the present century into the literature of agricultural science, it is highly disappointing to find that no new view is incorporated in the work. One would have thought that the ideas resulting from modern research with plants and soils would either have encouraged Ehrenberg, who has prepared for issuance the seventh edition of *Die Düngerlehre*, to inject into the book the spirit of the new agricultural science, or have deterred him from issuing it at all.

As it is, the book constitutes, in the reviewer's opinion, a useless work from the point of view either of the practical agriculturist or of the scientist. It seems unfortunate that so much good paper and printer's ink is devoted to the issuance of books which are dead before they are off the press.

CHAS. B. LIPMAN

Agrikulturchemie. (Agricultural Chemistry.) By DR. F. HONCAMP, Ord. Professor at the Landesuniversität and Director of the Landwirtsch. Versuchsstation at Rostock I. M., and Dr. O. NOLTE, Privatdozent at the Landwirtschaftliche Hochschule and Geschäftsführer of the D. L. G., Berlin. Theodor Steinkopff, Dresden and Leipzig, 1924. viii+160 pp. 22 × 15 cm. Price, unbound, 95 cents.

This little volume is one of a series of literature reviews in the field of natural science covering the period beginning with 1914 to date. This particular volume was finished in August, 1923. The series, which is issued under the general editorship of R. E. Liesegang, has for its purpose to help scientists, who because of the war could not keep up in their field of work, to acquire a mastery of the literature from 1914 onward. Each of its 148 pages of text makes brief reference to an average of ten original communications. It covers soils, plant nutrition, fertilizers, animal nutrition, feeding, and methods of investigation in agricultural chemistry generally. It does not cover dairy or fermentation chemistry. It contains but little other matter than brief reviews of original research, but it seems to cover the field in a thoroughly adequate manner, the American literature being very well represented. While the book makes no pretense to completeness, it covers a very wide range and should prove of great value to those who desire a guide to the research literature of agricultural chemistry which has appeared since 1914.

CARL L. ALSBERG