

presence of unstable isotopes, but have not completely eliminated the possibility of actinium as an impurity in the lanthanum and neodymium samples. This point is under investigation.

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NEW BOOKS

A History of Chemistry. By F. J. MOORE, Ph.D., Late Professor of Chemistry in the Massachusetts Institute of Technology. Second edition. Revision prepared by William T. Hall. McGraw-Hill Book Company, Inc., 370 Seventh Ave., New York, 1931. xxiii + 324 pp. Illustrated. 14.5 × 21 cm. Price, \$3.00.

The revision of this serviceable book has not involved a departure from the general plan of the first edition. The essential change, apart from restatements necessitated by recent discoveries, is the inclusion of biographical sketches of two groups of chemists, *viz.*, (1) brilliant chemists who died during the last twelve years and (2) deceased American chemists who contributed material to the development of chemistry in this country. It is to be regretted that the bibliography at the end of the chapters has not been enlarged, particularly since so many admirable articles on the history of chemistry have appeared during the last ten years in the *Journal of Chemical Education*. The chapter devoted to chemistry in the United States would be more in harmony with the rest of the book, and certainly more useful to American students, if the growth was described as a connected narrative rather than in the form of disconnected biographies. However, the book as revised is an excellent example of books in its field and a faithful expression of the scholarship of the author, whose life as a scientist and as a teacher is briefly recounted in the introductory portion.

LYMAN C. NEWELL

Elementary Qualitative Analysis for College Students. By J. H. REEDY, Associate Professor of Chemistry in the University of Illinois. Second edition. The McGraw-Hill Book Co., Inc., 330 West 42d St., New York, 1932. x + 163 pp. 13 figs. 14 × 21 cm. Price, \$1.50.

"The changes consist mainly in the inclusion of new procedures based upon reagents recently developed, and the extension of older methods to more difficult combinations. . . . Practically the whole book has been rewritten. . . . If the book has a distinctive feature, it is the emphasis placed upon interpretative work on the part of the student."

Preliminary experiments, notes, and exercises following each group will convince the student that the reagents and conditions as specified are well planned to separate the ions sharply and to detect them with certainty.

The theoretical treatment is clear and helpful. Greater stress might have been laid upon the fact that the whole of qualitative analysis can be formulated in terms of a very limited number of equilibria, and displacements of the same.

Here and there are statements which could be revised to advantage, and without appearance of pedantry. Thus ionic precipitates (p. 2) appear to be produced from

insoluble molecules preëxisting in solution. Stannic chloride and even stannic ion (p. 25) are pictured as stable in water. " NH_4OH is a very weak base" (p. 81). The electromotive series (p. 151) is merely a column of metals, rather than a comprehensive system of oxidizing and reducing agents arranged in pairs, the order of which depends upon concentrations.

This book is highly teachable. Grounds for criticism are few indeed, and unimportant when contrasted with its many admirable qualities.

G. S. FORBES

Lehrbuch der Metallkunde. Chemie und Physik der Metalle und ihrer Legierungen. (Textbook of Metals. Chemistry and Physics of Metals and their Alloys.) By GUSTAV TAMMANN, Göttingen. Fourth, enlarged edition. Verlag von Leopold Voss, Salomonstrasse 18 B, Leipzig C 1, Germany, 1932. xv + 536 pp. 385 figs. 15.5 × 23.5 cm. Price, RM. 48; bound, RM. 49.50.

This is the fourth edition of Tammann's well-known work, the first three of which, in 1914, 1921 and 1923 were issued under the title *Lehrbuch der Metallographie*. The former title connotes a study of the microscopic structure of metals, and since this book covers much more, the title is very properly changed to be more descriptive of the contents. As compared with the last edition, there has been a 50% increase in the number of diagrams, and a somewhat smaller increase in the number of pages and new text. The new text covers both new methods which have come into prominence during the last ten years, such as a description of the work of the German metallurgists on the plastic deformation of single crystals and a more adequate description of x-ray methods of analysis, and also the vast amount of new experimental knowledge of the phase diagrams of alloys. The old text has also in many cases been revised, but not in all. Thus, the very first sentence of the introduction is the same as the introduction of the original 1914 edition: "By the word alloy was understood, 30 or 40 years ago. . . ."

As is perhaps natural for an author who has himself covered so many of the fields of activity of the metallurgist, the emphasis is perhaps too much on Tammann's personal activities to give a well-balanced presentation of the whole subject. Thus it is unfortunate that matters in which Tammann does not agree with other investigators are presented without a reference to the other side or even an intimation that there is difference of opinion, such as the course of the melting curve at high pressures, and the significance of the behavior of eutectic and other mixtures under acid attack. There is also too little tendency to mention work in other countries than Germany. For instance, the important work of Hume-Rothery on intermetallic compounds is not mentioned by name, and in the tables the old formula Ag_3Zn_3 is retained instead of the new Ag_2Zn_3 , which is the basis of part of Hume-Rothery's theory, although there is in the text a brief reference to Ag_2Zn_3 in terms which cannot possibly bear on the Ag_3Zn_3 of the table.

When due allowance is made for all defects, however, the book remains a monumental one, and a record of an almost incredible amount of achievement for which Tammann has been personally responsible. No one can read it without being stimulated by the extraordinary range and vivacity of Tammann's imagination. What other author could present us from his personal experience with an array of topics, all of them made to have suggestive implications, such as: "The dependence of nuclear number on subcooling," "The spreading of mercury drops on metallic surfaces," "The precipitation of polonium from its solutions," "Change of color on cold-working," "The change with temperature of the angle at which two polished plates slide on each other," to mention only a few?

P. W. BRIDGMAN

Die experimentellen und theoretischen Grundlagen der Elektronenbeugung. (The Experimental and Theoretical Principles of Electron Diffraction.) By H. MARK and R. WIERL. Verlagsbuchhandlung Gebrüder Borntraeger, Schöneberger Ufer 12a, Berlin W 35, Germany, 1931. iii + 126 pp. 60 figs. 16.5 × 25 cm. Price, to subscribers, unbound, RM. 12; bound, RM. 13.60. Separately, unbound, RM. 16; bound, RM. 18.

What impresses one most about this monograph of Mark and Wierl is its completeness—no paper on the diffraction of electrons by atoms, molecules or crystals, either theoretical or experimental, has eluded the authors' attention, and none has failed to supply illumination to their text. In 126 pages the content of some 150 articles which constitute the literature of their subject up to April, 1931, is organized and reviewed in a discriminating and pleasing manner. This is particularly true of the sections devoted to the experimental work, which together make up about three-fourths of the whole.

The contributions which the authors have themselves made in this field are well known—particularly their important and beautiful work on the diffraction of electrons by molecular vapors. It is not surprising perhaps that with their interests more deeply engaged on the experimental side, their treatment of this part of the subject strikes one as rather more sure-footed than their treatment of the purely theoretical part. The latter is marred unfortunately by numerous typographical errors not all of which are corrected by a table of errata. With this not very important reservation, the monograph may be recommended as a comprehensive survey of its subject and a reliable guide to the literature.

The death of the junior author, announced recently in German periodicals, has come as a shock to physicists the world over. It would be difficult indeed to think of a young experimental physicist who had shown greater promise than Dr. Wierl.

C. J. DAVISSON

Manuale di Analisi Chimica. Clinica, Fisiso-patologica ed Igienica ad Uso dei Medici e Studenti. (Manual of Chemical Analysis: Clinical, Physio-Pathological and Hygienic. For the Use of Physicians and Students.) By CESARE SERONO and ALFONSO CRUTO. Second edition. Unione Tipografico-Editrice Torinese, Torino, Italy, 1932. xv + 483 pp. 85 figs. 15 × 22.3 cm.

This is an elementary textbook of the kind used by medical students thirty years ago, except that many of the biochemical methods described are fairly modern. It deals more exclusively with ordinary qualitative and quantitative analysis than with the analysis of biological material and does not correspond very closely to biochemistry as it is taught in this country.

OTTO FOLIN

Wissenschaftliche Photographie. Eine Einführung in Theorie und Praxis. (Scientific Photography. An Introduction to Theory and Practice.) By Dr. E. V. ANGERER, Professor at the Technical High School of Munich. Akademische Verlagsgesellschaft m. b. H., Leipzig C 1, Germany, 1931. viii + 185 pp. 99 figs. 16 × 24 cm. Price, M. 11, unbound; M. 12.80, bound.

This book fills in the gap between the elementary practical handbooks of photography on the one hand, and the very comprehensive treatises on the other. It provides a good general survey of the most important aspects of practical and theoretical photography, in terms familiar to the physicist and chemist, and in a manner calculated to assist them in an intelligent understanding of the principles of the science which they employ

in a considerable part of their work. It is regrettable that the average scientific worker is unable to make the best of use of the photographic process, owing to an incomplete understanding of the properties, and limitations, of photographic materials, and of the elementary principles underlying the photographic process. A study of this book should be of considerable help to him wherever he applies photography to his scientific or technical work.

WALTER CLARK

Les Problèmes de la Biochimie Moderne. (Problems of Modern Biochemistry.)

By G. FLORENCE, Professor in the Faculty of Medicine of the University of Lyon, and J. ENSELME, Docteur ès Sciences, Faculty of Medicine, Lyon. Preface by L. Hugounenq. G. Doin et Cie, Éditeurs, 8, Place de l'Odéon, Paris 6^e, France, 1932. 312 pp. Illustrated. 15 × 24.5 cm. Price, fr. 45.

Reading the table of contents of this book impresses one with its excellent plan. The first half is devoted to a description of biochemical molecules—static biochemistry. The second half includes a section on kinetic biochemistry and another on physiological chemistry. There is an appendix on nomenclature and another on thermodynamics.

The execution of the plan, however, is less satisfactory. Most useful publications relating to biochemistry are textbooks, monographs or accounts of investigations. In writing this book the authors have fallen between two stools; the result is less complete than a textbook and less precise and up-to-date than a monograph. Chapters 5-7 on the amino acids, peptides and proteins illustrate the point. These chapters contain less than one finds in many textbooks. Since the 52 literature references include only 3 which are later than 1927 the treatment is hardly more up-to-date than Cohn's "Physical Chemistry of the Proteins" published in *Physiological Reviews* seven years ago.

The numerous typographical errors are irritating and sometimes bewildering. The 24 items listed in the "Errata" are but a small proportion of the errors which occur. Thus on p. 192 one finds $[\bar{O}]$ for $[\overline{OH}]$, (H^2) for $[\bar{H}]^2$ and on p. 197, 6 1 for 6.1. One receives the impression that the chances are against correct spelling of English words. There are 4 English titles in the bibliography of Chapter II and a word is misspelled in each, *viz.*, *colloidal*, *proteines*, *leathe*, *dynamies*. An amusing aspect of the carelessness in proof reading is the originality in abbreviation. At least ten different abbreviations for *Zeitschrift* may be found.

D. B. DILL

Quantitative Clinical Chemistry. Volume II. Methods. By JOHN P. PETERS, M.D., M.A., Professor of Internal Medicine, Yale University School of Medicine, and DONALD D. VAN SLYKE, Ph.D., Sc.D., Member of the Rockefeller Institute for Medical Research. The Williams and Wilkins Company, Mt. Royal and Guilford Aves., Baltimore, Md., 1932. xix + 957 pp. Illustrated. 15.5 × 23.5 cm. Price, \$10.00.

This long expected volume has now appeared and it is doubtless being examined by many who knew beforehand that they must own it. Like the first volume, it is primarily a book for clinicians rather than for chemists. Its 32 chapters cover about every kind of quantitative measurement and determination called for in completely equipped clinical laboratories. But the book is not a compendium or handbook giving a description of all of the better known methods. The 200-page section devoted to the description of gasometric methods is by far the most comprehensive and complete and naturally so because of Van Slyke's extensive work in this field of analysis. Many of the other

chapters are unexpectedly brief. In these chapters, the authors, as is explained in the preface, have endeavored to confine themselves to the description of one method representing each of the major fundamental principles of analytical chemistry, such as weighing, titration and colorimetry.

This scheme, excellent as it may be in the field of inorganic analysis, does not correspond very well to the development of biochemical analysis during the past twenty years, and the authors have not been able to adhere to it with any high degree of uniformity. The plan has also compelled the authors to assume the responsibility of selecting one out of several methods of sometimes equal and in other cases of unequal merit. In the case of uric acid in urine, for example, nearly all present-day determinations are made colorimetrically, and several reliable procedures based on this principle are known. Only one colorimetric method is given for this determination, however, and it happens to be a short-cut method which is unreliable in practice and theoretically indefensible. The extensive experience of the authors has of course saved them from making many such unfortunate selections. Most of the methods selected for description are undoubtedly capable of yielding valid results even though, in some cases, they are not the best known or most widely employed. Among the methods of doubtful validity should perhaps be cited those given in Chapter 19 on the determination of phenols in blood and in urine. This statement is in no sense a reflection on the authors, but it is probably a fact that the methods as yet available for the determination of phenols, including the methods for which the reviewer is responsible, should still be regarded only as tentative or provisional procedures.

Chapter 15 is rather interesting in that here the authors describe the method for the determination of creatinine in blood and admit that they still use the method while at the same time they endorse the view that blood contains no creatinine. That view rests on rather slender evidence, but the interpretation is important since it carries with it the corollary, also accepted by the authors, that the creatinine in the urine is formed in the kidneys.

Most of the chapters in the book open with a general discussion more or less historical in character, and all of the different chapters contain a generous supply of references to original literature. Some of the described methods are based only on personal communications.

The appearance of this book has one especial significance. As its title indicates, it deals only with quantitative determinations. The innumerable often meaningless and sometimes misleading qualitative tests, which still represent nearly all that many clinicians know about the applications of biochemistry, are omitted. Teachers of biochemistry in medical schools might well note the important hint implied in the appearance of such a book by two such eminent authors.

OTTO FOLIN

Chemistry of the Opium Alkaloids. By LYNDON F. SMALL, Consultant in Alkaloid Chemistry, United States Public Health Service, and ROBERT E. LUTZ, Associate Professor of Chemistry, University of Virginia. Prepared by direction of the Surgeon-General as Supplement No. 103 to the Public Health Reports. Superintendent of Documents, Government Printing Office, Washington, D. C. ix + 375 pp. 15.5 × 23.5 cm.

Seldom, in all probability, has such a wealth of detailed information in reasoned form been presented in so small a compass as in this volume, which is a result of cooperative work between the Committee on Drug Addiction of the Division of Medical Sciences of the National Research Council and the Division of Mental Hygiene of the U. S. Public Health Service. Those who have followed the painstaking investigations

in the domain of alkaloid chemistry published from the laboratory of the authors must have recognized the erudition which had necessarily to be acquired before research in this intricate and well-explored field could be undertaken. That the fruit of so much laborious reading has now been laid before the public, in palatable and relatively assimilable form, is truly a matter for congratulation.

The subject matter is divided into two parts, dealing with the alkaloids derived, respectively, from benzylisoquinoline and from phenanthrene; each part is subdivided into about eighteen sections devoted to individual alkaloids and their immediate derivatives. Every section is constructed on the general plan: (1) history, (2) empirical description, (3) development of constitution, (4) synthesis, (5) description of salts and derivatives, (6) bibliography. Not a word is wasted, nor is, apparently, a pertinent fact omitted. By means of an appendix, covering the literature of about two years, the information has been brought up to date of January 1, 1932.

Professor Wieland, in an appreciative Foreword, subscribes to the belief of the authors that "every reaction and every compound described in the literature is mentioned," and points out that this book far transcends a mere systematic collection of facts by virtue of its historical and critical treatment of the questions of constitution. Organic chemists should be grateful to the authors and to the government for publishing so impressive and valuable a work.

H. T. CLARKE

BOOKS RECEIVED

November 15, 1932–December 15, 1932

- GEORGE L. CLARK. "Applied X-Rays." Second edition. McGraw-Hill Book Company, Inc., 330 West 42d St., New York. 470 pp. \$5.00.
- JEAN-LOUIS DESTOUCHES. "État Actuel de la Théorie du Neutrons." Hermann et Cie., Éditeurs, 6 Rue de la Sorbonne, Paris Ve, France. 68 pp. Fr. 18.
- L. W. EASTWOOD. "Introduction to Metallography." Mimeographed edition. Edwards Brothers, Inc., Lithographers and Publishers, Ann Arbor, Mich. 137 pp.
- J. FRENKEL. "Wave Mechanics. Elementary Theory." Oxford University Press, 114 Fifth Ave., New York. 278 pp. \$5.00.
- STEFAN GOLDSCHMIDT. "Stereochemie." Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 6, Leipzig C 1, Germany. 311 pp. M. 27.80; bound, M. 29.
- G. ALBERT HILL AND LOUISE KELLEY. "Organic Chemistry." P. Blakiston's Son and Co., Inc., 1012 Walnut St., Philadelphia, Pa. 564 pp. \$3.00.
- DAVID INGERSOLL HITCHCOCK. "Physical Chemistry for Students of Biology and Medicine." Charles C. Thomas, Publisher, 220 East Monroe St., Springfield, Illinois. 182 pp. \$2.75.
- MURRAY P. HORWOOD. "The Sanitation of Water Supplies." Charles C. Thomas, Publisher, 220 East Monroe St., Springfield, Illinois. 181 pp.
- J. W. MELLOR. "A Comprehensive Treatise on Inorganic and Theoretical Chemistry. Vol. XII. Uranium, Manganese, Manganese, Masurium, Rhenium, Iron." Longmans, Green and Co., 55 Fifth Ave., New York. 944 pp. \$20.00.