NEW BOOKS

The Life and Work of Professor William Henry Perkin. By A. J. GREENAWAY, J. F. THORPE and R. ROBINSON. Published by the Chemical Society, Burlington House, London W 1, England, 1932. 138 pp. Illustrated. 13.5 × 21 cm. Price, 3/6, postage 3d.

This volume contains, first, a personal biography by A. J. Greenaway, a life-long friend of Perkin; second, a discussion of Perkin's early work and particularly of his work on the formation of carbon rings, the chemistry of camphor and the chemistry of the terpenes, by J. F. Thorpe; third, a discussion of Perkin's work on the constitution of berberine, on brazilin and haematoxylin, on harmine and harmaline, and on cryptopine and protopine, by R. Robinson; fourth, a bibliography of the 271 published papers of Perkin, by his son, William Henry Perkin, Jr.

It is appropriate that this Memorial Volume should appear as a special number of the Journal of the Chemical Society, since Perkin was a Longstaff Medalist, first Pedler Lecturer and past President of that Society. Moreover, Perkin published in the Society's Journal the results of most of his investigations, and in token of the great affection which he always had for the Society, he made it a reversionary bequest of £1000.

This volume is a welcome addition to our knowledge of one of the world's great chemists.

ARTHUR B. LAMB

A Comprehensive Treatise on Inorganic and Theoretical Chemistry. By J. W. MELLOR, D.Sc., F.R.S. Vol. XII. **Uranium, Manganese, Masurium, Rhenium,** Iron (Part I). Longmans, Green and Co., 55 Fifth Ave., New York, 1932. xiii + 944 pp. 320 figs. 15.5 × 25 cm. Price, $20.00.

This volume represents a long step toward the completion of a great undertaking. With it Uranium, Manganese, Masurium and Rhenium are completed (the two last elements were unknown when the first volumes of this treatise appeared!) and a good beginning has been made on Iron.

It is particularly gratifying that Iron has at last been reached, for there is at present no up-to-date, reasonably complete presentation in English of the chemistry of this most important metal.

This volume retains the excellent characteristics of its predecessors. There is, indeed, an unusual abundance of diagrams and figures. The chapter on the history of Iron contains a wealth of interesting information.

ARTHUR B. LAMB

The History of the Phlogiston Theory. By J. H. WHITE, Ph.D. Edward Arnold and Co., 41–43 Maddox St., London W. 1, England, 1932. 192 pp. 12.5 × 19 cm. Price, 6s., net.

This work is the author's Ph.D. thesis approved for the degree of the University of London. We are glad that there is a University where a student can earn a Doctor's degree by work in the history of science. And we are glad that this particular book has been published—for a history of the phlogiston doctrine has been needed and this is the first time that it has been attempted. It is a book which all students of the history of chemistry will wish to have in their libraries. But it is not in all respects

a satisfactory treatment of the subject, for it is weak on the early history and weak on the late history, especially as regards the last defenders of the doctrine. It makes no mention of Daniel Sennert or of the passage from Sennert, quoted by Boyle in "The Sceptical Chymist," which contains the word, *phlogisten*. It fails to point out the similarity between the old symbols for fire, for sulfur, and for phlogiston. Fire was represented by a triangle pointed upward (fire goes up), sulfur by the same triangle with a cross like a plus sign depending from the middle of its base (the material of fire), and phlogiston by the sulfur symbol with little circles at the corners of the triangle (the principle of fire). The similarity is a really etymological one, and supports the author's correct conclusion that "Stahl conceived phlogiston as a principle; his disciples turned it into a material." The author's several conclusions are essentially sound. The book is good reading, and it will help to dispel the misunderstandings which too generally obscure the early history of our science.

TENNEY L. DAVIS

Anleitung zur Massanalyse, eine Einführung in die Elemente der Theorie und in das praktische Arbeiten für Studierende der Chemie und Pharmazie. (Volumetric Analysis, An Introduction to Theory and Laboratory Methods, for Students of Chemistry and Pharmacy.) By Dr. FRANZ HÖLZL, Lecturer in Inorganic, Analytical and Physical Chemistry in the University of Graz. Verlag von Franz Deuticke, Wien, Austria, 1933. x + 141 pp. 14 × 21 cm. Price, M. 4.

The little booklet covers an introductory course in Volumetric Analysis offered by the author to students in Chemistry and Pharmacy at the University of Graz. The theory of the subject has been well treated and a very large number of volumetric methods has been discussed in a condensed way. A more limited selection of practical methods, however, would have been more useful in a text of this kind. The reviewer was surprised to learn that none of the sulfophthaleins and no indicators changing color near the neutral point are mentioned. Altogether, it may be said that the author has well succeeded in offering a modern introduction to volumetric analysis.

I. M. KOLTHOFF

An Introductory Course in Physical Chemistry. By WORTH HUFF RODEBUSH, Ph.D., Professor of Physical Chemistry, University of Illinois, and ESTHER KITTREDGE RODEBUSH, M.A. D. Van Nostrand Company, Inc., 250 Fourth Ave., New York, 1932. xiii + 421 pp. 109 figs. 14 × 22 cm. Price, $3.75.

Textbooks for classes in elementary physical chemistry must of course take note of current advances in this rapidly growing field. In about 100 pages less than the usual comprehensive texts, the authors of "An Introductory Course in Physical Chemistry," while retaining in exceedingly compact form most of the major foundations of the subject, have devoted an unprecedented amount of space to current developments. Sample topics not usually treated include: quantum theory of rotational heat capacity, heat capacities of ortho- and para-hydrogen, theory of the diffusion pump, the "parachor," the Condon–Gurney theory of radioactive disintegration, wave mechanics, spectral terms and the quantization of electrons, the magneton, interchange binding. The last 73 pages, on The Atom, The Molecule and Activation of Atoms and Molecules, go far beyond anything hitherto attempted in an elementary text and are on the whole admirably written and probably as clear as these subjects can be made in such short compass. Unfortunately some of the newer material is presented without adequately preparing the necessary background. In such cases the effort "to stimulate the interest

of the student" may result in baffling him instead, or at best furnish him with a dangerously superficial familiarity with "modern" words and formulas. Striking examples are the sections on heat capacity of gases and on the structure of atomic nuclei.

The first fourteen chapters (341 pp.) cover the classical foundations of physical chemistry concisely and fairly completely, and in a thoroughly sound manner. Historical, descriptive and experimental matter has been largely eliminated, and along with it the need for an author index. Few words are wasted, with the result that the pace occasionally becomes very rapid, notably in the sections dealing with ionic equilibria and the general relations of thermodynamics. The customary effort has been exerted to make the book serviceable to students inadequately prepared in mathematics. Derivations requiring the calculus, even those of the most fundamental importance, nearly all appear in small print. On the other hand, a good working knowledge of general physics is assumed. There are some novelties in the order of presentation. Thus homogeneous equilibrium is taken up before solutions; heterogeneous equilibria occupy parts of two chapters, according to whether or not a solution phase is present (solid solutions and three-component systems are omitted); discussion of free energy changes precedes the First Law; strong electrolytes come before weak.

There are more than 200 problems, apparently mostly original, with answers in some cases. Since only one problem of a given type is included, the variety is wide, and many of them should be unusually stimulating. A few detailed references, almost entirely to very recent work, and a short list of general references at the end of each chapter, are provided. There is a large and excellent selection of numerical data, taken largely from "International Critical Tables"—a fact which possibly accounts for the Publishers' foreword appealing to the student to retain his copy for future use. The authors' style is scientific but readable, and special efforts have been made to anticipate and clarify the usual student difficulties. Except in the section on rate of reaction, there are very few typographical errors. Typography and figures are excellent.

The book is recommended to the careful examination of any one interested in a sincere and ambitious attempt to "modernize" elementary physical chemistry.

ARTHUR F. BENTON

Incunabula of Tannin Chemistry. A Collection of Some Early Papers on the Chemistry of the Tannins Reproduced in Facsimile and Published with Annotations. By M. NIERENSTEIN. Edward Arnold and Co., 41–43 Maddox St., London W. 1, England, 1932. v + 167 pp. Illustrated. 19 × 25.5 cm. Price, 12s./6d., net.

Dr. Nierenstein has made many important contributions to the chemistry of the tannins and has long pursued the study of the history of chemistry. The two interests are brought together in the present book. The thirteen papers which compose it are in English, in German, and in French, and they differ considerably in their length. They serve admirably to illustrate the growth of knowledge in this field, while the notes make clearer their relation to the present organic chemistry of the subject. The earliest item is from a German *Hortus Sanitatis* of 1485, another details the first attempt to isolate the astringent principle of the gall-nut, another shows that Davy was really the first discoverer of catechin, not Runge, and the most recent one is a paper of Pfaff, 1808, in which it is shown that neither gallic acid nor pyrogallol is tannin since neither is precipitated by gelatin and in which the attempt is made to evaluate astringency in a scientific manner.

The book ought to be of interest to workers in tannin chemistry, but its subject is too special to make it of general interest to students either of organic chemistry or of the history of chemistry as a whole.

TENNEY L. DAVIS

Ausführliches Lehrbuch der organischen Chemie. (A Comprehensive Textbook of Organic Chemistry.) By WILH. SCHLENK AND ERNST BERGMANN. Vol. I. Verlagsbuchhandlung Franz Deuticke, Helferstorferstrasse 4, Wien, Austria, 1932. viii + 805 pp. 49 figs. 17 × 25.5 cm. Price, M. 36; bound, M. 39; half leather M. 41.

In writing this book the authors have recognized the need of a modern work in organic chemistry which extends beyond the scope of the material presented in the usual textbook. This volume makes it possible for the reader to acquire a more comprehensive knowledge and a better understanding of this important subject. It will aid the industrial chemist in keeping abreast with the developments in the pure science.

The description of individual compounds has been reduced to a minimum and in this respect the book is fundamentally different from the well-known Richter–Anschütz Organic Chemistry. The relation between the reactions in the various fields of organic chemistry has been stressed. The proofs of structure and the mechanism of reactions have been concisely and explicitly pictured. The inclusion of physical, physico-chemical and biological contributions to organic chemistry in various discussions has served to demonstrate the general importance and many-sided aspects of organic chemistry. All the material has been happily presented in a clear and interesting manner.

The industrial applications have not been considered in detail and in fact this phase of organic chemistry has been touched upon only in those instances where it is necessary in order for the reader to receive the proper conception of the compound or field under discussion. The book has been written to arouse in the student a genuine appreciation as well as to supply him with accurate knowledge of the fundamentals of organic chemistry, and in this the authors have been eminently successful.

This volume, which presumably precedes others, covers primarily the aliphatic series under the usual headings. The corresponding cyclic (non-aromatic) compounds of each type have been included. Many subjects involving interesting and important though complicated compounds which are superficially treated or else just mentioned in less extensive texts are presented in a most acceptable manner. There is found an excellent discussion of such topics as the structure of cellulose, of lignin, of rubber, of hemoglobin, a description of the important facts and theories concerning polymerization, sterins and vitamins. The material throughout has taken into consideration the recent advances in the various fields of organic chemistry.

The volume stands out by itself in contrast with other advanced texts now available. It can be highly recommended to students of organic chemistry who desire to go beyond the elementary stages and to the teacher who wishes to review and consolidate his knowledge. The volume should find a wide use and chemists will look forward with eagerness to the completion of this comprehensive text.

ROGER ADAMS

Perkin and Kipping's Organic Chemistry. By F. STANLEY KIPPING, Ph.D., Sc.D., F.R.S., Professor of Chemistry, University College, Nottingham, and F. BARRY KIPPING, M.A., Ph.D., University Demonstrator in Chemistry, Trinity College, Cambridge. Entirely New Edition, Parts I and II. J. B. Lippincott Company, 227 South Sixth St., Philadelphia, Pa., 1932. xi + vi + 614 pp. + xxix. Illustrated. 13 × 19.5 cm. Price, $3.50.

It is needless to review in detail this well-known text which was first published in 1894 and which has been used since that time by so many teachers of organic chemistry. This revision has involved mainly a certain improved rearrangement of subject matter and the addition here and there of material which has helped to bring the work up to date. The major change in Part I is the description of halogenated compounds imme-

diately after the saturated hydrocarbons, and in Part II the elimination of the chapter on Terpenes and parts of the chapters on Carbohydrates and Cycloparaffins. The later chapters in Part II covering pyridine, quinoline and other heterocyclic compounds, vegetable alkaloids, amino acids and related compounds, uric acid and purine derivatives, important components of animals and plants, dyes and their applications have been rewritten and considerable additions have been made.

It was noticeable to the reviewer that, although the subject matter in this text corresponds approximately with that which is usually covered during a two years' course of lectures, the authors did not attempt to discuss the electronic structures of aliphatic nitro compounds nor of other organic compounds, the properties of which cannot be well explained on the basis of the usual formulas. Incidentally, the aldehyde and ketone sodium bisulfite compounds have been assigned the structure $>C\begin{matrix}OH\\ \diagup\\ \diagdown\\ OSO_2Na\end{matrix}$ in this volume, with no mention of an alternative structure. Such comments as these, however, are of perhaps minor importance.

The book has been completely reset and is much more attractive in appearance than the previous editions. This revision will be welcomed by those who have had success with the older editions and should be of interest to all who are teaching organic chemistry.

ROGER ADAMS

Die Methoden der Dien-synthese. (Methods of Diene Synthesis.) By KURT ALDER. Abderhalden's "Handbuch der biologischen Arbeitsmethoden," Abt. I, Chemische Methoden, Teil 2, 2 Hälfte, Heft 9 (Schluss). Urban and Schwarzenberg, Friedrichstrasse 105 B, Berlin N 24, Germany, 1933. xxi + 213 pp. 17.5 × 25.5 cm. Price, RM. 13.50.

The present number of Abderhalden's comprehensive treatise is devoted mainly to an account of the diene synthesis which is more commonly known as the "Diels and Alder reaction." In this account, Alder presents the first carefully drawn and complete picture of this prolific synthesis—its history including accidental anticipations, its rapid development, its application to problems in organic and biological chemistry, its probable role in nature and its limitations. For this admirable account, which contains everything of importance published up to June, 1932, organic chemists will be no less grateful than the biochemists for whom it was written.

As this number completes the section dealing with general chemical methods, it also contains a table of contents and a very complete index for the entire volume.

E. P. KOHLER

Die oxydativen Gärungen. (Oxidative Fermentations.) By Dr. K. BERNHAUER, Lecturer in The German University at Prague. Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany, 1932. viii + 196 pp. 17.5 × 26 cm. Price, RM. 16.80; bound, RM. 18.

Under this title the author discusses the chemical activities of microörganisms which bring about oxidations of either the substrate itself (*e. g.*, glucose) or some decomposition product of the substrate (*e. g.*, acetaldehyde). This approach enables the author to include both aerobic and anaerobic fermentations. In the latter case the reduction products must, of course, balance the oxidation products, and the question may fairly be raised as to whether it is logical to include anaerobic fermentations under such a title.

The monograph consists of six sections. The first deals with the biology and morphology of the aerobic microörganisms involved, *viz.*, the vinegar bacteria and certain molds; the second discusses simple oxidations, such as the formation of sugar acids from sugars and of ketoses from sugar alcohols; the third reviews the formation of oxida-

tion end-products of anaerobic sugar fermentations (mainly bacterial); the fourth, the longest section, deals with secondary oxidation products such as succinic, fumaric, citric and oxalic acids; the fifth is devoted to industrial applications and to several miscellaneous fermentations; and the last covers the methods for isolating and culturing the microörganisms and for identifying various fermentation products.

The fourth section contains an excellent review of the various theories regarding the mechanism of citric acid and oxalic acid formation. At the end of the monograph there are two very convenient tabular indexes dealing with (1) the formation and conversion of various compounds by means of microörganisms, and (2) the chemical activities of individual microörganisms. Approximately a thousand references are made to the source material on which the work is based.

The second, fourth and fifth sections appear well done, but the first, third and sixth, and especially the third, seem inadequate. No reference is made to the acetic–lactic fermentation of pentoses and the treatments of the propionic and the acetone and butyl alcohol fermentations are notably deficient. Only three references are given to the acetone–butyl alcohol literature and only one of these is later than 1920. Probably five times as much has been written about this important industrial fermentation since 1920 as in the years preceding that date.

Because of the multiplicity of systems in use in various countries for designating scientific journals, a list of abbreviations would have made it easier to determine what journals are meant by such inadequate abbreviations as "Bl.," "Fr." and "Soc." Some adverse criticism should also be directed against the use of citations from the *Chemisches Zentralblatt* instead of the original journals in which the papers appeared. In spite of its omissions this monograph will be of great service to those who are interested in the chemical aspects of fermentation.

W. H. PETERSON

BOOKS RECEIVED

March 15, 1933–April 15, 1933

A. BÖMER, A. JUCKENACK AND J. TILLMANS, Editors. "Handbuch der Lebensmittelchemie. Allgemeine Bestandteile der Lebensmittel. Ernährung und allgemeine Lebensmittelgesetzgebung." Verlag von Julius Springer, Linkstrasse 23–24, Berlin W 9, Germany. 1371 pp. RM. 126; bound, RM. 129.60.

HARRIETT H. FILLINGER. "Experiments in General Chemistry for Colleges." Harcourt, Brace and Company, 383 Madison Ave., New York. 146 + 167 pp.

MICHELE GIUA AND CLARA GIUA. "Dizionario di Chimica Generale e Industriale. Chimica Agraria, Biologica, Bromatologica, Farmaceutica, Geologica, Mineralogica, Tecnologica, Tossicologica." Vol. I, Abaca-Eykman. Unione Tipografico-Editrice Torinese, Corso Raffaello 28, Torino 116, Italy. 1083 pp. Lire 165.

ROY K. MCALPINE AND BYRON A. SOULE. "Qualitative Chemical Analysis." Based upon the Text by A. B. Prescott and O. C. Johnson. D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. 696 pp. $4.50.

JOSEPH REILLY AND WILLIAM NORMAN RAE. "Physico-chemical Methods." D. Van Nostrand Co., Inc., 250 Fourth Ave., New York. 822 pp. $8.00.

"Annual Reports on the Progress of Chemistry." Vol. XXIX, 1932. The Chemical Society, Burlington House, London W 1, England. 344 pp. 10s./6d., postage, 6d.

"Hommage a Henri Moissan, 4 Octobre, 1931." Published by *Chimie et Industrie*. Société de Chimie Industrielle, 49 Rue des Mathurins, Paris VIII, France. 93 pp.