

NEW BOOKS.

J. H. van 't Hoff's *Amsterdamer Periode, 1877-1895*. By DR. W. P. JORISSEN, Lektor a. d. Univ. Leiden and DR. L. TH. REICHER, Priv. Dozent a. d. Univ. Amsterdam.

This well written, well printed, and copiously illustrated little book of 106 pages does not pretend to be a complete biography; the story of van 't Hoff's life has been told so often and so recently that the authors are justified in treating most of it as well known, and have contented themselves with adding chapters from their personal recollections, and quotations from relatively inaccessible Dutch publications.

A section is devoted to the establishment, in 1785, of a professorship of Chemistry in Amsterdam, and sketches of those who have filled the chair and the conditions under which they worked. As appendix, four little known articles by van 't Hoff are republished, all of autobiographical interest: one in memory of his predecessor Gunning, two to mark the doctor-jubilees of his students van Deventer and Reicher, and a third "Die Verwirklichung einer Vorhersagung in einer Rektoratsrede" which gives a brief description of his life and work in Berlin.

Quoting Carlyle, the writers say: "We cannot look, however imperfectly, upon a great man, without gaining something from him," and these stories of life in the laboratory and of the personal relations of van 't Hoff with his colleagues and students, even the undergraduate criticism of his lectures taken from the students' yearbooks, help us know van 't Hoff as something more than a contributor to the *Z. physik. Chem.*; his two former assistants deserve our thanks.

Bibliographies of van 't Hoff's books, pamphlets and papers, and of the dissertations from his laboratory in Amsterdam, and a list of biographical sketches and articles on van 't Hoff and his work close the book.

W. LASH MILLER.

"Higher Mathematics for Chemical Students." By J. R. PARTINGTON. Methuen & Co., London. 1911. pp. 279. Price, 3 s. 6 d.

Chemistry has always made great use of symbols but it is nevertheless true that chemists have all too frequently objected to the use of mathematical symbols or failed to use this most valuable scientific aid in their investigations. Text-book writers frequently explain that, in their books, as little use of the calculus has been made as possible. This is, however, a situation in chemistry which is rapidly passing. Comparatively few students, who have taken the regular college courses in mathematics, can apply their knowledge to scientific problems, and the appearance of the Nernst-Schoenflies "Einfuehrung in die mathematische Behandlung der Naturwissenschaft" in 1895 was a welcome text as indicated by the fact that it is now in the sixth edition. Mellor, in his "Higher Mathematics for Students of Chemistry and Physics," has given us a book which

is particularly rich in examples of the application of higher mathematics to scientific data and problems. Mellor's book also contains considerable thermodynamics and many mathematical tables and is fairly complete, so that it is a valuable handbook. Along these same lines we now have this book on "Higher Mathematics for Chemical Students, by J. R. Partington. It is clearly written and not too formidable a book, so that it must be really interesting reading to students who have not connected their mathematics and experimental data and problems. The book is distinctly an addition to the texts that the chemist must use. It seems to the reviewer that more attention should be given to the theory of probabilities in its application to the questions of errors of measurements and the question of judgment in interpreting results, indeed a valuable and interesting book might be written along these lines.

G. A. HULETT.

Contemporary Chemistry. By E. E. FOURNIER D'ALBE. pp. xvi and 180. New York, 1911: D. Van Nostrand Co. Price, \$1.25.

This book is, in the author's words, "intended to give a bird's-eye view of the whole field of modern chemistry." "It is proposed to outline the laws, conceptions, and ideals underlying the new chemistry, to show where they are at variance with Physics, and where the bridge between the two sciences has already been thrown."

The reviewer attaches high importance to conscientious efforts to present in popular and readable form the results of scientific research and the present ambitious work certainly possesses, in an unusual degree, the excellent quality of readability. It, moreover, gives evidence of a very wide familiarity with the immense field which the author endeavors to cover. The style is colloquial and lively, but it must, with regret, be noted that the effort to make it so is sometimes forced and not infrequently leads to serious literary defects. It is only possible to point out a few passages illustrating some of the latter. ". . . . We are still some distance off a plausible theory of spectra." (p. 31) ". . . . We at once get optically active forms, implying a tri-dimensional¹ arrangement." Speaking of the ignition of thermit, the surprising statement (p. 135) is made: "An intense combustion is the result, in the course of which the aluminium deprives the iron of its oxygen, and the latter escapes at a white heat." "Had that mind been free from the incubus of authority the 'call of the wild' might have been irresistible even then. But there was Plato and Aristotle; there was the elaborate syllogistic system of scholasticism, prepared to crush and devour all virgin thought in its powerful jaws" (p. 14).

¹ Asymmetric is meant. The reference is to molecules of optically active carbon compounds.

"The phlogistic doctrine was now tottering to its fall. The man who knocked it down was Lavoisier" (p. 16).

"At the absolute zero of temperature, illustrated by the graveyard, there would be evidence of crystallization in the quadratic system" (p. 3).

Professor Loeb might object to this: "If carbon is still to be quadrivalent—and no organic chemist except Gomberg will hear of anything else."

A few dubious statements are made, which should receive the author's attention in case of the issue of a new edition. Thus (pp. 135-136), we read *à propos* of the manufacture of aluminium:

"If it were possible to use bauxite instead of cryolite, the process of obtaining aluminium would be much cheapened; That event will mark a new era." Other similar instances may be found at pp. 20 and 128 (foot).

The theory of osmotic pressure as presented on pp. 65-66 appears open to serious criticism. The statement (p. 141) that "The rarity of ancient specimens of glass proves that glass devitrifies in a few centuries," rests on a kind of logic that one hardly expects to find in a scientific book, and the reference (p. 27) to "Ramsay's noble gases, Argon, Crypton, Xenon" is unjust to Lord Rayleigh.

In conclusion it is not too much to say that "Contemporary Chemistry" is the most interesting work of its kind that has appeared for many years and is marked by wide learning and by a vivid style of treatment.

LAUNCELOT W. ANDREWS.

Experiments in General Chemistry. By W. S. HENDRIXSON. Printed at Grinnell, Iowa. pp. 64 and 14 figures.

A collection of 157 experiments covering the common elements and their compounds. There is no remarkably new mode of attack, nor originality in the choice of the experiments described, while those covering the metals are too largely restricted to the information that would be acquired in a course in qualitative analysis. Experiments on chlorine and carbon monoxide are described without any warning as to the poisonous nature of the materials. As a whole the experiments are well chosen and well adapted to an elementary course, though there is a lack of quantitative experiments, and of those questions which may serve to induce a scientific curiosity.

H. ISHAM.

Stand und Wege der analytischen Chemie. By W. BÖTTGER. xiii Band der "Die chemische Analyse." Ferdinand Enke, Stuttgart. pp. 53. Price, M 1.80.

This little pamphlet is introductory to the general subject of analytical chemistry and was suggested by an article on the present condition of analytical chemistry by W. F. Hillebrand which was published in

THIS JOURNAL, 27, 300. The author first reviews the history of this branch of chemistry, particularly the attitude taken by great chemists of the past towards analytical chemistry. Second, the general principles underlying gravimetric and volumetric analysis are discussed and it is shown how various principles of physical chemistry may be applied to improve analytical methods and to explain results.

The paper shows the importance of analytical chemistry as a dignified branch of the great science and emphasizes the need of placing this branch upon a sound scientific basis. The paper is well worth reading as the subject is admirably treated.

O. L. SHINN.

A Textbook of Practical Chemistry for Technical Institutes. By A. E. DUNSTAN, D.Sc. (London), Head of the Chemical Department, East Ham Technical College, and F. B. THOLE, B.Sc. (London), F.C.S., Lecturer in Organic Chemistry, East Ham Technical College. With numerous diagrams. Methuen & Co., Ltd., London. September, 1911. Crown 8vo., pp. viii + 335. 3 s. 6 d.

This book is one of Methuen's Textbooks of Science, for "Secondary Schools and Schools of Science." It is intended as a guide to laboratory work and is very generally amplified by brief but careful discussions of the theory connected with the experimental work in hand. The resulting correlation of laboratory and lecture work cannot avoid being helpful to the student. The immediate object in writing the book has been to collect in one moderate priced volume the experimental chemistry usually performed by students in the modern English technical school, most of whom find the various treatises used, too expensive. In this laudable purpose great success has certainly been achieved and the book should also be a most useful reference volume to the student.

The contents comprise: "Dry tests" (11 pp.). A now a days much neglected art in the study of chemical substances. The common inorganic compounds are examined systematically after the manner of determinative mineralogy. "Reactions of the ions" (89 pp.). The extent of the work in qualitative analysis is shown by the fact that among the negative ions considered are such cases as aluminate, zincate, stannate, persulfate, dithionate, silicofluoride, borofluoride, and permanganate ions. "Group analysis" (21 pp. including "analysis for negative ions"). "Reactions of the 'rare' elements" (14 pp.). "Volumetric analysis" (29 pp.). "Gravimetric" and "complete analysis" (35 pp.). "Simple gasometry" (10 pp.). "Organic section" (79 pp.), including: tests for elements in organic compounds; quantitative estimation of elements; common organic estimations; common operations in organic preparations; identification of simple organic substances (30 pp.); "Physico-chemical determinations" (23 pp.); Appendix (18 pp.), consisting of tables of solubilities, preparation of reagents, atomic weights, logarithms, specific gravity, boiling and melting points, etc.

It is noticeable that in the determination of silica but a single evaporation is recommended. There appear, however, to be few such objectionable procedures. The precautions to be noted are very clear and, especially in the early portion of the book, excellent. Full page charts are printed which start the student from some common substance, such, for instance, as the mineral chromite when studying the reactions of chromium. The steps are indicated on the chart whereby the student is to proceed from the mineral to the various important compounds, performing as he goes along the common reactions required for qualitative analysis, thus blending inorganic preparation work with the qualitative study of reactions. The other chapters of the book seem equally as practical. Mineral analysis, it is cheerful to note, will not be a lost art with the student who completes the analytical exercises of this volume.

JAMES R. WITHROW.

Traité Complet d'Analyse Chimique Appliquée and Essais Industriels. Par J. POST and B. NEUMANN. Deuxième édition française entièrement refondue. Traduite d'après la troisième édition allemande et augmentée de nombreuses additions par G. Chenu, M. Pellet. Tome troisième, premier fascicule. Engrais commerciaux, amendements et fumiers—terre arable et produits agricoles—air—huiles essentielles—cuir et matières tannantes—colle—tabac—caoutchouc et gutta-percha—matières explosives et allumettes. Avec 56 figures dans le texte. Paris: Librairie scientifique A. Hermann et Fils. 1912. pp. 1-468.

Brief notices of earlier instalments of this book have already been published in THIS JOURNAL, 30, 912; 31, 120. The book must, naturally, be compared with Lunge's "Untersuchungsmethoden," somewhat to the advantage of the latter. This may not be entirely fair, however, for the two works do not cover exactly the same ground, and the matter presented by Post and Neumann is undoubtedly excellent and up-to-date. The chief fault seems to be a lack of proportion in subdividing the book. The extremes in the present fascicle are Explosives and Matches, which occupy 135 pages, while "Arable Soil and Agricultural Products" are disposed of in 7 pages. Perhaps this only shows that the authors and the reviewer have different ideas about book-making. C. E. WATERS.

Die Kolloide in Biologie und Medizin. By H. BECHHOLD. Dresden. 1912. xii + 441 pp. Theodor Steinkopff, publisher. Price, bound, 15.50 Marks.

For all dimensions of matter, from those of atomic systems to those of world systems, the laws of form and stability have been carefully studied and, in general, well defined. Only systems whose parts are in size, roughly speaking, between the dimensions of the molecule and those of particles easily visible with the ordinary microscope, still defy simple general treatment. These are the colloids, the ultimate morphological elements, according to the ordinary conception of the term morphology, of the living cell. Biology, accordingly, is especially delayed by the fail-

ure of the physical sciences to elaborate a simple method of dealing with the colloids, such as the laws of solution provide for molecules, such as structural chemistry provides for the arrangement of atoms.

The new work of Bechhold, himself an accomplished investigator of the role of colloids in biology, seeks so far as possible to obviate such difficulties by providing a systematic treatment of this subject, and the author has been on the whole remarkably successful in his difficult enterprise.

The book is divided, according to a plan at once convenient and logical, into four parts—first, an introductory discussion of theory, general physico-chemical facts, and methods of investigation, secondly, a description of the colloidal constituents of living organisms and their products, thirdly, a discussion of the organism as a colloidal system, and finally, a discussion of toxicology, pharmacology, and the microscopist's technique in their relation to colloids.

In the present state of knowledge it is impossible for such a work to possess any characteristics of finality. But the author, squarely facing the necessity of being at times superficial and at other times of substituting possible suggestions for missing facts, has managed to combine a great variety of information in such manner as will render it available to many workers in biology and medicine and help them to a clearer understanding of some of the great problems of both the statics and dynamics of living matter.

Especially satisfactory is the simple treatment of theory, including the theory of adsorption. The simplifying explanations of phenomena are extracted from the theories, but at the same time great care is taken to avoid rigid application of theories of processes too complicated for such treatment at the present time.

The work contains considerations of many different data and theories of varying merit, and there are among them, no doubt, a certain number which will be subject to revision in the future; but such is one of the difficulties of the pioneer. It is to be hoped that this work will, through future editions, grow up with the subject, for it fills a most important place in scientific literature.

L. J. HENDERSON.

Handbuch der Mineralchemie. Vol. I, No. 5. By DOELTER, *et al.* Theodor Steinkopff, Dresden. M. 6.50.

This number of "Mineralchemie" completes the subject of mineral melting points and the influence of pressure on them. A comprehensive table of silicate melting points, so far as they have been determined, is included. Other important physical properties of the silicates, *viz.*, latent heats, specific heats, thermal and electrical conductivities, viscosities and volume changes in melting are then considered. The data

belong to different periods of development and are of all degrees of value, but the scarcity of reliable data is everywhere evident. The present state of our knowledge is sometimes satisfactorily summed up, and sometimes otherwise. The latter portion of the book is given up to the consideration of binary systems of the silicates. Here some highly fantastical diagrams might well have been omitted. In connection with these silicate systems are discussed some highly interesting geological questions, such as natural eutectics, resorption and zonal structure, the order of crystallization from magmas, the application of the phase rule to the eruptive rocks, and the structure of the latter.

E. T. ALLEN.

The Technology of Bread-making, Including the Chemistry and Analytical and Practical Testing of Wheat, Flour, and Other Materials Employed in Bread-making and Confectionery. WILLIAM JAGO, F.I.C., F.C.S., AND WILLIAM C. JAGO. American Edition. Bakers' Helper Co., Chicago, 1911. pp. 908+viii. Price, \$6.50.

This cyclopaedic volume is the outgrowth of the earlier and smaller editions which appeared in 1886 and 1895 on the same subject from the pen of the senior author and the mode of treatment of the present volume is, in general, the same as that of the earlier editions. The scope of the work is even greater than is indicated by the title and sub-title as a glance at the table of contents shows. The book might really be divided into several parts, the first of which deals with matters of general Chemistry, Physics and Biology for here we find chapters on Inorganic and Organic Chemistry, the Microscope and Polarization of Light, Mineral and Fatty Matters, the Carbohydrates, the Proteins, Enzymes and Diastatic Action, Fermentation, Bacterial and Putrefactive Fermentation, Technical Researches on Fermentation and the Manufacture of Yeasts. The first twelve chapters, therefore, occupying 253 pages, deal for the most part only in an indirect way with the subject in hand, serving as a storehouse of fundamental chemical and biological knowledge. Obviously, the treatment of some of these subjects is brief, simple and rather one-sided, the intention being to supply just those facts which are necessary for the thorough understanding of the later technical details.

The second part, chapters 12-18, deals with the structure and physiology of wheat grain, chemical composition of wheat, strength of flour, many tables of analyses of various products of milling and the bleaching of flour.

What may be called part three, chapters 18-22, takes up the subject of bread-making, special breads, and bread-making processes, bread improvers and a general discussion of the nutritive value and digestibility of various breads, with a chapter on the weighing of bread. Another short section, chapters 23-24, treats of bake-house design and the machine

bakery and its management and goes exhaustively into the architecture and mechanical equipment of bakeries.

The remaining nine chapters, with the exception of the last, describe analytical methods, bread analysis, adulterants and their detection and routine mill tests. The last chapter discusses confectioners' raw materials, especially substances used in the making of other products than bread.

One is surprised and almost overcome at the size of this work. A cursory examination of it suggests that much of the material in the first seventeen chapters might be condensed and a part of it omitted, and this belief is strengthened by careful reading. One wonders why it should be necessary to devote so much space to General Chemistry, Physics, etc., when there are so many elementary books on the subject which give the reader a somewhat broader view. This seems to be, however, one of the class of books in which no previous knowledge is taken for granted. This over-expansion is perhaps the most serious fault that can be charged to the book, as the descriptions in the preliminary chapters are in general clear and the statements accurate. Occasionally there is a statement which may be questioned, a term used which has a double meaning where modification could make the meaning perfectly evident. An example of this is found on page 31 where the term chloride of lime is used when hypochlorite is meant. Another unimportant criticism may also be made in that there is frequently unnecessary detail in description, as for example, under the head, "How to Use the Microscope," we find this statement, "To commence using the microscope remove it from the case" This is but one of numerous occurrences of this sort. While this detail may be necessary in some quarters in order that directions may be followed carefully, the general effect on the trained reader is to lessen interest and make the volume tiresome. The data of analyses and other investigations which were presented in the older volumes have been practically retained with the addition of more recent results. It may be fairly questioned whether analytical data obtained as far back as 1852 are of real value as compared with similar data obtained within the last five years, especially in view of the great improvement in certain methods of analysis.

In the chapter on proteins the official nomenclature recently adopted is set forth and the results of much of the new work on vegetable proteins are given in an excellent way. After such concise and up-to-date account of the proteins, one is surprised to find at the end of the chapter a paragraph on the nature of putrefaction which presents an old and long since abandoned view, for in it one finds no mention of bacteria as inciting causes and the inference is that air is responsible. I quote, "It would thus appear that putrefaction is not a process appertaining exclusively

to the grain itself, but is in some way dependent on the action and presence of air."

The chapters dealing with yeast and fermentation are in general clear and excellently presented, except for some vagueness regarding the difference between "high" (top) and "low" (bottom) yeasts. In the reviewer's opinion the chapter on Bacterial and Putrefactive Fermentation is the poorest in the book as it contains many inaccuracies and misstatements. To include the bacteria under the caption "Moulds" is inexcusable, and there is a lack of exactness or looseness of statement pervading the whole chapter.

We may summarize the situation by saying that the chapter is not up-to-date and presents an antiquated view of this subject.

When, however, the authors attack the real subject of bread and bread-making it is at once apparent that they are on familiar ground and masters of their art and the results are correspondingly gratifying. The book then becomes a veritable mine of information especially on the English procedures and practically all important researches on bread and bread-making are cited or referred to. All kinds of breads are treated, special methods are described in detail and the subject treated in a most thorough and exhaustive manner. This portion of the volume cannot fail to be a most valuable book of reference for all who are engaged in the baking industry.

The chapters on the commercial testing of wheat and flour and the methods of analysis present a great variety of analytical methods. Some of these differ in certain respects from the standard methods of the official agricultural chemists but it is at least interesting to have such a variety of methods of analysis collected in one reference volume.

From the standpoint of book-making the volume is attractive, the printing is good, important sentences or statements are printed in heavy type and thus made prominent and easily found, and typographical errors are rare. Except, therefore, for the fact that there seems to be a lack of concentration, the volume must be regarded as of the highest value and easily the most authoritative work upon the subject.

S. C. PRESCOTT.