

## NEW BOOKS

**Qualitative Chemical Analysis.** BY HERMAN T. BRISCOE, Professor of Chemistry, Indiana University. The D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, 1931. v + 279 pp. Illustrated. 14.5 × 22.5 cm. Price, \$2.25.

This book is typical of the Qualitative Analysis text that should be in general use in colleges. Not only are the theoretical principles underlying all analytical operations fully and clearly dealt with, but, to quote the author's own words, "proper correlation between theory and practice" is preserved throughout. The reviewer would have liked a fuller treatment of some topics like complex ions and amphoteric hydroxides and the addition of other important ones like the "salt effect," occlusion, perhaps buffer solutions and the modern method of expressing hydrogen-ion concentrations, which are not treated at all. The reviewer criticizes also the comparatively extended discussion on atomic structure, a rapidly shifting field, which has no particular place in a course in Qualitative Analysis. The Bohr atom was abandoned by Bohr himself years ago and physicists are agreed that a mechanical representation of atomic structure is, at the time of writing this review, an impossibility. The student should have been warned that some solubility products, as for example those of the sulfides, should be taken with a grain of salt. Hydrolysis, oxidation and reduction are very well treated. The laboratory separations, although perhaps not as rigid as those of A. A. Noyes, are generally satisfactory and accompanied by excellent notes in which constant application is made of the principles taught in the theoretical part, a rare accomplishment in the average run of textbooks on Qualitative Analysis.

The book is well printed and bound, free from typographical errors, the diagrams are well drawn and to the point and the reviewer feels he can recommend the book to those desiring to teach a modern course in Qualitative Analysis.

J. ENRIQUE ZANETTI

**Tables annuelles de constantes et données numériques de chimie, de physique, de biologie et de technologie.** (*Annual Tables of Constants and Numerical Data Chemical, Physical, Biological and Technological.*) Published under the auspices of the International Research Council and the International Union of Pure and Applied Chemistry by the International Committee appointed by the Seventh Congress of Applied Chemistry (London, June 2, 1909). Table des Matières des Volumes I à V. Années 1910 à 1922. (Table of Contents of Volumes I-V, 1910-1922.) Edited by G. KRAVTZOFF. McGraw-Hill Book Company, Inc., 370 Seventh Avenue, New York, 1930. lxiii + 382 pp. 22.5 × 28 cm.

As the number of volumes of Annual Tables has increased, it has become correspondingly laborious to search through them for quantitative data published during recent years pertaining to any particular subject. In the future, this labor will be considerably lessened by the use of the

General Index—the first volume of which has now appeared, covering the years 1910 to 1922.

This first volume contains an Introduction explaining the use of the Index, and a list of the French abbreviations. The latter are, however, for the most part self-evident and practically international. Next comes an Analytical Index, which is substantially a very complete table of contents. This is followed by an Alphabetical Index in French; but German, English and Italian translations have been inserted where advantageous, followed by the French equivalent. Finally, there is a Formula Index, which constitutes the bulk of the whole volume. In it, the chemical elements are arranged according to a system similar to that adopted by the new edition of the Gmelin-Kraut handbook, in which the non-metals come first, then carbon, and finally the metals arranged alphabetically according to their symbols.

A second volume of the Index is promised for 1933, covering the years 1923-1930 (Volumes VI to X). Thereafter, it is planned to issue a volume of the Index at five-year intervals. When this schedule has been attained, the labor of consulting the Annual Tables will be still further diminished. Nevertheless, in order to cover the data published during any preceding twenty years, it will still be necessary to inspect three or four volumes of the Index and two to six of the current volumes of the Annual Tables. The only method of lessening this somewhat formidable task would apparently be first to make each five-year volume of the Index cumulative, say for fifteen years, and second to decrease the lag in the appearance of these volumes behind the corresponding volumes of the Annual Tables. These remedies would, however, doubtless entail considerable additional expense.

This Index, even though it may not in the future afford the greatest possible measure of convenience, is nevertheless of very great value in rendering more available the unique collection of data in the Annual Tables.

ARTHUR B. LAMB

**The Principles of Quantum Mechanics.** By P. A. M. DIRAC, Fellow of St. John's College, Cambridge. The Oxford University Press, 114 Fifth Avenue, New York, 1930. x + 257 pp. 16 × 24 cm.

The spirit and the character of this book may perhaps be best expressed by two sentences taken from it. "The new theories, if one looks apart from their mathematical setting, are built up from physical concepts which cannot be explained in terms of things previously known to the student, which cannot even be adequately explained in words at all." "The only object of theoretical physics is to calculate results that can be compared with experiment, and it is quite unnecessary that any satisfying description of the whole course of the phenomena should be given." From

these quotations (though, in the last analysis, they must be seen to be entirely correct) it would be at once inferred that this is not a book for the beginner who wishes to learn quantum mechanics; and, indeed, it is rather directed to the experienced student of that subject, who wishes to study its logical foundations.

Though there is a sort of preview of the physical ideas involved in the first chapter, in general, the method of the book consists in the development of a purely abstract algebra to which the physical results are then "hung on" as representations. The reviewer is not convinced that this is necessary for a logical presentation of the theory, and it has the disadvantage that it greatly increases the difficulty of reading the book, since one has to learn two notations and the connections between them. Nevertheless, any book which presents the ideas of one who has had such a role in the development of the subject will be received with great interest, especially as most of his original work is there presented in connected form.

Having laid the foundations of the subject, the author proceeds to discuss many of its most important applications. This section of the book can be read only after thorough mastery of the ideas and notations of the first part. The last chapter treats of the relativistic theory of the spinning electron, and the author's recent work on the proton.

OSCAR K. RICE

**The Quantum Theory.** By FRITZ REICHE, Principal of Physics at the University of Breslau. Translated by H. S. HATFIELD, B.Sc., Ph.D., and HENRY L. BROSE, M.A. E. P. Dutton and Co., Inc., 286-302 Fourth Ave., New York, 1931. viii + 218 pages. 15 figs. 12.5 × 19.5 cm. Price, \$2.10.

The original German edition appeared in 1920 and its English edition in 1922. The present English edition is identically the same as the 1922 edition except for the addition of a chapter of 24 pages and 64 notes and references. The preface states: "A few alterations have been made in the earlier pages. Chapter IX has been renamed. A table of contents and useful formulae and a bibliography have been added." In the new chapter the attempt is made to sketch the development of the quantum mechanics from the status of the theory in 1923. The material touched upon includes the Compton effect, de Broglie waves, Schrödinger's, Heisenberg's and Dirac's contributions to quantum mechanics, electron spin, Bose-Einstein statistics, Fermi-Dirac statistics, Raman effect among other items and finally the "Outlook of Atomic Theory in 1930"; all this in a twenty-four page chapter plus four and one-half pages of "Notes and References." The reader moderately well acquainted with the present-day status of quantum mechanics will hardly recognize in the new material more than a brief synopsis of topics while the student approaching the subject *de novo* will find the new chapter incomprehensible.

F. G. KEYES

**Lehrbuch der Metallkunde des Eisens und der Nichteisenmetalle.** (**Textbook of Metal Science of Iron and the Non-Ferrous Metals.**) By DR. PHIL. FRANZ SAUERWALD, Professor at the Technical High School of Breslau. Julius Springer, Linkstrasse 23-24, Berlin W 9, Germany, 1929. xvi + 462 pp. 399 figs. 16 × 23.5 cm. Price, RM. 29.

In writing this book the author has had three aims: first, a developed synthesis of the whole range of the science of metals, avoiding the necessity of referring the reader to many books on various special subjects with corresponding lack of correlation; second, to stimulate readers to ask and answer their own questions through the problems discussed; and third, to present the results of the author's investigations and those of his colleagues. Somewhat more than half of the book is devoted to the general science of the metallic state, alloys, and consideration of technical manufacturing processes. The remainder is concerned with the fundamental properties of iron, cast iron, steel and the non-ferrous metals. There are a number of unusual features in this work which alone should commend the book to all physical metallurgists. Among these may be mentioned the properties of metals in the liquid and gaseous states, a thorough fundamental treatment of the mechanical properties of metals, rates of reaction and diffusion, the properties of liquid alloys, technical corrosion and means for combating it, the measurement of shrinkage during solidification, and statistical methods in plant investigations. Throughout the work one finds the direct application of physical-chemical laws to metallurgical problems. One feels that the author has been substantially successful in his aims and that here is a book which every progressive physical metallurgist will wish to have in his reference library.

R. H. ABORN

**Quantitative Clinical Chemistry.** Vol. I. Interpretations. 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, Maryland, 1931. xvi + 1264 pp. 124 figs. 15 × 23.5 cm. Price \$12.00.

This huge volume probably would not be interesting to many readers of THIS JOURNAL, but it should prove valuable as a reference book to clinicians. It gives a very impressive picture of the extent to which chemistry, especially analytical chemistry, is being applied in the study of diseases. Clinical chemistry is by far the most baffling field of biochemistry, and for this reason, as well as for certain other reasons, very little of its literature can be accepted without reservation until it has been repeatedly confirmed. It is therefore rather doubtful whether the fields covered by this book actually merit so large a volume, and whether it would not have been better to defer the inclusion of many observations, with their references, to later

editions. The cautious reader should certainly be prepared for the probability that hundreds of original papers cited as authority for statements occurring in the book will turn out to be erroneous or misleading.

The arrangement of the material is different from what one finds in other books on clinical chemistry and is, on the whole, to be commended. There are no chapters on the chemistry of any body fluid or tissue. The headings of the twenty-one chapters into which the book is divided are as follows: Total Metabolism; Carbohydrates; Lipoids; Non-protein Nitrogen and Nitrogen Metabolism; Urea; Ammonia; Amino Acids; Uric Acid; Creatine and Creatinine; Total Organic Acids, Lactic Acid and Ketones; Phenols; Hemoglobin; Proteins of the Blood Plasma, Urine and other Body Fluids; The Volume of the Circulating Blood; Total Base, Sodium and Potassium; Calcium; Magnesium; Carbonic Acid and Acid-Base Balance; Chlorides; Phosphorus; Sulfur. This predominantly chemical arrangement of the material has worked out very well, and it is easy to find any information contained in the book. The index is excellent.

For so large a book the text in some chapters is surprisingly meager. Chapter III, for example, on the lipoids, has over 10 pages of bibliography to only 26 pages of text. And what there is of text in this chapter is not altogether to be commended. The oxidations of the fatty acids, if touched upon at all, should have been described in more detail. The discussion of the digestion and absorption of fat is not only too brief, but is also antiquated and misleading. The essence of the subject as given, page 230, is represented by the following brief paragraph: "It was long believed that emulsified free fats could be directly absorbed; but the studies of Munk (151) conclusively proved that this was not the case and that only emulsified fatty acids could be absorbed."

It may not be possible to deny flatly that either neutral fats or fatty acids are absorbed in the form of emulsions, but Munk's quaint paper, of 1880, proved only that fatty material is absorbed about equally well whether given in the form of fats or as fatty acids. Pflüger's dictum that solution rather than emulsification is a necessary prerequisite for absorption has lost nothing in probability with the passing of time. Pflüger is not mentioned either in the text or in the bibliography.

One curious slip of the pen was found in this chapter, page 229: "Because of its choline content cholesterol has been considered as the source of bile acids."

While a slight tendency toward one-sidedness and partiality is to be detected in many other chapters, the book as a whole will prove an almost inexhaustible mine of information to the large and constantly increasing number of persons who are doing or trying to do research in the field of clinical chemistry.

**Die Riechstoffe und ihre Derivate. (Perfumes and their Derivatives.)** Edited by ALFRED WAGNER, Editor of *Die Riechstoffindustrie*, with the coöperation of ALFONS M. BURGER and F. ELZE. Part I, Aldehydes of the Aliphatic Series; Part II, Aldehydes of the Alicyclic Series; Part III, Aromatic Hydroxyaldehydes with Saturated Side Chains—Dihydroxyaldehydes—Aromatic Ether Hydroxyaldehydes with Saturated and Unsaturated Side Chains—Aroxylaldehydes; Part IV, List of Patents—Index of Patents—Author Index and Alphabetical Subject Index. A. Hartleben's Verlag, Singerstrasse 12, Vienna, 1, Austria, 1929, 1930, 1931. 1431 pp. 17 × 26 cm.

This volume in the large Hartleben project on perfumes and their derivatives naturally deals primarily with aldehydes that have some actual or potential interest in connection with perfumes. In reality this interest is conceived broadly and nearly all aliphatic and alicyclic aldehydes, as well as a large number of aromatic representatives are passed in review.

Beginning with an excellent introductory chapter containing general methods of preparation and general reactions, the authors continue with the "practical part" in which the aldehydes are considered, one by one, and end with a transcript of patents which constitutes approximately a fourth of the entire volume.

In general, the description of an individual aldehyde contains an account of its history, a discussion of its structure, a complete list of sources and methods of preparation, a review of methods for its detection and quantitative estimation and extensive summaries of its derivatives. All of these matters, which may be regarded as essential to a complete description, are presented with the utmost thoroughness, and supported by innumerable references. One marvels at the patience with which this material has been accumulated and the skill with which it has been tabulated.

But one wonders also on what principles this volume has been organized, and for what manner of reader. Structural formulas of the aldehydes are followed by equally detailed formulas of oximes, hydrazones, semicarbazones which drag their tiresome lengths across the page. Descriptions of aldehydes are immersed in minute accounts of substances which add little to the picture, like cumol, cuminic alcohol, cuminic acid, para cymol and terephthalic acid in connection with cuminic aldehyde. Moreover, the authors insert a number of long papers which are printed verbatim, from periodicals that are so readily accessible as the "Berichte" and "Liebig's Annalen."

It may appear ungracious to protest that a volume offers too much, but the increasing and frequently unnecessary length of many modern treatises makes them too expensive for the individual and it seems unfortunate that a volume which, like this one, contains so much of value should be available only in those libraries in which it is not necessary to count the cost.

E. P. KOHLER