

## NEW BOOKS

A **Chemical Dictionary**, Containing the Words Generally Used in Chemistry, and Many of the Terms Used in the Related Sciences of Physics, Astrophysics, Mineralogy, Pharmacy, and Biology with Their Pronunciations. Based on Recent Chemical Literature. By INGO W. D. НАСКИ, Professor of Chemistry, College of Physicians and Surgeons, School of Dentistry, San Francisco, California. P. Blakiston's Son and Co., Inc., Philadelphia, Pennsylvania, 1929. vi + 790 pp. 18 × 25.5 cm. Price \$10.00.

This volume, comprising some 30,000 terms, is a serious attempt to provide a moderately comprehensive pronouncing dictionary of chemical terms, and is the first such available in English for more than a century. It is obviously intended to be definitive rather than encyclopedic. The style is uninvolved, the selection of terms on the whole good and the printing and proof reading are satisfactory. The book is embellished with many small halftone portraits of famous chemists in connection with brief biographical data, with some pictures of apparatus and with tables in considerable variety, many of which furnish novel and highly useful arrangements of data.

It is not to be expected that so great a mass of unrelated facts could be assembled without the presence of errors, both of fact and of judgment. A number of rather common terms are not to be found, including ethyl gas, slip, sorbite as a constituent of steel,  $\alpha$ -cellulose, doctor solution, hard and soft coal, and Sorel cement. Other terms are incompletely defined with respect to their chemistry; for example, no reference is made to the modern meaning of lacquer, fat and lean as limiting adjectives in the description of ore and clay, the chemical nature of chromel, the compositions of many minerals, and the chemical properties of some elements. The less common dyes, rocks, explosives, theories, laws, and named tests, are for the great part omitted. Pronunciations as a rule are simply and accurately indicated; but there is an obvious error in that of Müller which is given as *mool-er*. Among the five or six actual errors in fact casually noted, that of pyrex being defined as a trade name for "carbon tetrachloride, used as a fire extinguisher," was the most obvious, for "pyrene" is not defined with this meaning. An occasional tendency toward looseness of grammatical structure has permitted some adjectives (such as hyroscopic and quinquivalent) to be defined as nouns.

A number of terms only distantly related to chemistry are included; fath. (abbreviation of fathom), cardiograph, hibiscus, reductio ad absurdum, Ericinae are examples. Frequently only the commoner and best known forms of apparatus are defined and illustrated by cuts, whereas it is usually the less common forms that most need definition and illustration.

It is unnecessary to emphasize that these matters are of no great importance in comparison with the value of the book as a whole. Both the

author and the publishers deserve the thanks of all chemists, the former for the vast amount of time and effort he has given to the compilation, and the latter for their understanding of the need that existed for such a volume in the face of general pessimism on the part of most publishers. In spite of its faults it is vastly superior to any other chemical dictionary in English and becomes at once a necessary part of the working library of every active chemist.

WILLIS A. BOUGHTON

**A Text-book of Inorganic Chemistry.** Edited by J. NEWTON FRIEND. Vol. VI, Part III. **Vanadium, Niobium and Tantalum.** By SYDNEY MARKS, M.Sc., A.I.C. J. B. Lippincott Company, Philadelphia, Pa., 1929. xxvi + 222 pp. 15 × 23 cm. Price, \$10.00.

The appearance of this volume in Friend's series on Inorganic Chemistry is welcomed by the increasing number of chemists who have become interested in the elements with which it deals. One hundred and twenty-six pages of the volume are devoted to the chemistry of vanadium and its compounds, thirty-seven to niobium (columbium), and thirty-five to tantalum. As this series is already well known, it is only necessary to say that the volume has been prepared with the same care and in the same style as the previous volumes of the series. Since it deals with three elements which have become increasingly important from the technical standpoint, its appearance at this time is of especial interest. The thoroughness with which the subject matter is treated, together with the large number of references to original articles, should make this book a most excellent basis for students interested in the study of these elements. Industrial chemists who find it necessary or desirable to become more fully acquainted with the chemistry of these elements will find in this volume a most excellent source of information. The book will make a valuable addition to any library on Inorganic Chemistry.

C. W. BALKE

**Cours de chimie à l'usage des candidats à l'école des hautes études commerciales et aux instituts de chimie.** (A Course in Chemistry for Admission to Business and Technical Schools.) By JEAN ISABEY. Gauthier-Villars et Cie., 55 Quai des Grands-Augustins, Paris, France, 1930. iv + 395 pp. Illustrated. 16.5 × 25 cm. Price, 70 fr.

This is a brief manual or crammer's guide to elementary general and organic chemistry, intended for students reading for the entrance examinations of certain special schools. The selection of topics is guided by the examination syllabus, so that the author feels apologetic for discussing the oxides of nitrogen, which are not on his little list. He has not, however, gone so far as to mention chromium, manganese, cobalt, nickel,

cadmium, antimony or bismuth except in alloys, so that the prospective reader need not fear many excursions into useless byways.

In the periodic table used the symbol and atomic weight of radon are incorrect and the "rounded" atomic weights include 126 for Te, 127 for I, 240 for U and many other peculiar values. The degree of dissociation of normal solutions of several strong acids is stated to be 93% without further explanation or discussion. It is to be hoped that the book fulfils its primary purpose. It can hardly be recommended to a wider circle.

NORRIS F. HALL

**The Beginnings of Chemistry. A Story Book of Science for Young People.** By HARRIETT BLAINE BEALE. Illustrations by J. Edmund Woods. Coward-McCann, Inc., 425 Fourth Avenue, New York, 1929. ix + 243 pp. 13 × 19 cm. Price, \$2.50.

The author is a lady of outstanding social distinction and charm. Her literary craftsmanship is competent and good. She has written many books and her "Stories from the Old Testament" have found constant favor for a score of years. Now the portal of chemistry, the popular exposition of the very beginning of the subject, is so unsatisfactory that we look with eagerness to every new essay in this field. Surely, anyone who can succeed in making Leviticus for the Little Ones or Deuteronomy for Débutantes attractive—although probably under other titles—deserves our earnest attention. The trouble we have in making chemistry a cultural study gives us abundant reason to look diligently for a better approach than we have.

We cannot say that Mrs. Beale has succeeded. Experiments are not recommended to the young readers, which may be of comfort to parents, for children should not play with fire. But the quest of the childish mind to learn what things are made of can hardly be satisfied in a manner to encourage further curiosity when we make the revelation that things are composed of elements. Curiosity is likely to stop right there. The words used in the book are simple but the grasp of the subject is not. Errors are to be found, but more of them would gladly be forgiven if only the approach were made more alluring; in substance rather than in form.

Perhaps some day a popular author will take a leaf from the book of the late Egerton Grey, published by Heffer and Sons, Cambridge, England, and use his little box of tricks. Grey provided weak solutions of reagents which are dropped upon microscope slides, then drawn together by a thin glass rod and the reactions observed through a cheap magnifying glass. That gives the pupil a chance to see something happen. Such a book might expound each reaction and then lure the curiosity of the pupil to the observation of other phenomena, that he sees taking place all around, on every hand. We think this might provide a better start.

ELLWOOD HENDRICK

*Cours de chimie-physique.* (A Course in Physical Chemistry.) Vol. I. By L. GAY, Professor of Physical Chemistry of the Faculty of Sciences of Montpellier. Preface by G. URBAIN. Librairie Scientifique Hermann et Cie., 6, Rue de la Sorbonne, Paris, France, 1930. xii + 705 pp. Illustrated. 16 × 25 cm. Price, 85 fr.

For some years students at French universities and technical schools have had to depend chiefly on translations of foreign textbooks of physical chemistry. It is hoped that this completely French text may take their place. The plan of the work includes three volumes and the large size of this first volume shows that an extensive treatise is planned. This is the more striking when one sees how narrowly the field treated has been restricted. The author is greatly concerned that physico-chemical questions be treated with rigor and precision, and thus "turns and returns his subjects in every direction, tracing out and finally banishing every ambiguity." Such a method, however, is applicable only to the best-tested and most "classical" part of modern physical chemistry, so that no attempt is to be made, in any of the three volumes projected, to treat atomic and molecular structure, radioactivity or the classification of the elements.

We are left with the following scheme: Volume I, Part I, General Thermodynamics; Part II, The Crystalline and Dilute Gaseous States; Part III, Osmosis and the Phase Rule; Part IV, The Pure Substance; Volume II, Binary and Ternary Mixtures, Chemical Equilibria, Solubility of Solids in Liquids, Alloys, Dilute Solutions—Volume III, Electricity and Magnetism, Capillarity, Colloids, Chemical Kinetics, Radiant Energy, Photochemistry.

The thermodynamical part will not fail to surprise the American-trained reader. After sixteen pages devoted to systems of units (of which more later) the second chapter treats the purely physical relations of work, force, pressure, potential, complete and partial differentiation, etc. Conservation of energy as a purely mechanical principle is followed by Thermometry and Calorimetry, with a misleading diagram to illustrate the calibration of thermometers at the boiling point of a liquid, and with no mention of adiabatic calorimetry. The Principle of the Equivalence of Heat and Work is followed by a brief chapter on thermochemistry, which is intended merely to introduce the Carnot-Clausius Principle. This is elaborated in the classical manner. After the fundamental thermodynamic quantities have been defined and used at length, Entropy, and the two thermodynamic potentials often called "free energy" are mentioned, discussed in a few pages and dismissed with the remark that "their correct application is a delicate matter, their experimental determination difficult," and that "one can easily do without them in studying physical chemistry." They are never again mentioned.

The chapters on the kinetic theory of gases and the crystalline state are followed by one on the specific heat of solids from which one might gather

that the determination of approximate atomic weights through the rule of Dulong and Petit was a matter of great importance today. A diagram of the variation of specific heat with temperature is given, but the explanation of the form of the curves, and of the failure of the equipartition theorem is deferred to Volume IV. In the part which follows we find a leading place assigned to osmotic pressure, which is used (since the method of Gibbs has been discarded) in the development of the phase rule. The last part deals with vaporization, sublimation, fusion, equation of state, Brownian movement, crystallization, allotropy. The allotropy of phosphorus is discussed with reference to Jolibois' experiments only, and there is no mention of the problem of black phosphorus. One gathers that the "red phosphorus" formed at  $260^{\circ}$  is a chemical individual. "Violet" or metallic phosphorus is not discussed. Thirty well-planned problems complete the text. There are no references to the original literature, which must diminish the value of the book as a work of reference. The general atmosphere of the book is one of classical severity and restraint, and no pains have been spared to drive home the important points. The lack of experimental material is perhaps responsible for a certain impression of dryness which the reviewer feels. Where experimental data are used their source is not stated, and the values chosen (*e. g.*, for atomic weights) are not always those currently accepted. The guiding interest seems to have been physical rather than chemical. The reviewer was interested to learn that since 1926 the M. T. S. (mètre, tonne-masse, seconde) system of units has been the legal one in France, including the *sthène* (force giving to a metric ton an acceleration of 1 meter-second<sup>-2</sup>), (= 1000 *newtons*), the *kilojoule* and the *pièze* (1 *sthène*-meter<sup>-2</sup>).

NORRIS F. HALL

**Röntgenographie der Metalle und ihrer Legierungen.** (X-Ray Analysis of Metals and Their Alloys.) By M. C. NEUBURGER, Wien. Ferdinand Enke, Verlag, Stuttgart, Germany, 1929. viii + 278 pp. 66 figs. 16.5 × 25 cm. Price, RM. 25.

This book is a companion volume of the author's "Röntgenographie des Eisens und seiner Legierungen" which appeared last year. In the present volume the author confines himself therefore to the crystal structures of the non-ferrous metals and alloys.

So abundant has been the recent publication of crystal structure data and so widely scattered the places of publication, that one is frequently at a loss to find, without ceaseless searching of the journals, the information which he may want. There is a real need for the compilation and critical analysis of existing crystal structure data, and this the present author has done most admirably in the more limited field of metals and alloys.

After an introduction dealing with the present theory of solid solution in metals (*Mischkristalle*), the author takes up in each succeeding section

first, the crystal structure of each pure metal and then the structure of the alloys of that metal. Where various experimenters disagree, the conflicting data are presented and discussed and the result which seems most probable is stated. Throughout the book the additive relation of Vegard in the case of solid solutions is strongly stressed.

There are given many complete tables of data from the original papers and a large number of cuts of the original powder photographs. An alphabetical index of lattice constants for the metals and their compounds is given at the back of the book and also a full bibliography.

On the whole, this book should prove a very valuable work of reference to anyone interested in this field.

WILLIAM P. JESSE

**Handbuch der biologischen Arbeitsmethoden.** (Handbook of Biological Methods.) Edited by Professor Dr. EMIL ABDERHALDEN. Section III. Physicochemical Methods. Part B, No. 5. **Methoden der Kolloidforschung.** (Methods of Investigating Colloids.) **Methoden der Viscosimetrie kolloider Lösungen.** (Viscosimetric Methods for Colloidal Solutions.) By RUDOLF KÖHLER, Leipzig. **Methoden zur Bestimmung des kolloid-osmotischen Druckes in biologischen Flüssigkeiten.** (Methods for Determining Osmotic Pressure in Biological Fluids.) By MARIE WRESCHNER, Berlin-Dahlem. **Methoden zur Bestimmung der elektrischen Struktur kolloider Stoffe, insbesondere der Biokolloide.** (Methods for Determining Electrical Structure of Colloids, Particularly of Biocolloids.) By REINHOLD FÜRTH, Prague. Urban and Schwarzenberg, Friedrichstrasse 105B, Berlin N 24, Germany, 1929. xx + 155 pp. 87 figs. 17.5 × 25.5 cm. Price, RM. 9.

Biologists are becoming more curious about viscosity and since many of us have not appreciated that Poiseuille's law is not applicable without modification to protein and to colloidal solutions, Köhler's review comes at an opportune time. He describes methods applicable to protein solutions and gives equations from which true viscosity can be calculated. The paper is devoted principally to work in Wo. Ostwald's laboratory. Perhaps too little attention is paid to the work of Hess and of Couette.

The paper on osmotic pressure contains an excellent summary of the literature and brief descriptions with illustrations of osmometers used by Biltz, Donnan, Sørensen and Krogh. The oncometer used by Schade is described without comment although Krogh and others do not accept Schade's assumption that the osmotic pressure of crystalloids and the imbibition pressure of colloid sols are different phenomena. Schade has coined the phrase "oncotic" to emphasize the distinction. Krogh points out that the experiments of Sørensen, Loeb and Svedberg leave no room for doubt concerning the essential identity of the processes resulting in osmotic pressure of colloids as well as of crystalloids.

Fürth is an authority on the subject he discusses. The title is rather obscure, for the paper is devoted to methods of measuring (1) potential

differences in microscopic dimensions, (2) electrical layers on sol particles by cataphoresis, etc., (3) degree of dispersion and diffusion coefficients and (4) dielectric constants.

These three papers conclude the volume on methods of investigating colloids and a subject index of the entire volume is included. Abderhalden adds the comment that observations on the colloidal state frequently employ models so far removed from the living organism that it is difficult to appraise their value to the biologist. Colloid chemistry continues in a state of flux and further developments will soon require an expansion of this volume.

D. B. DILL

**Ergebnisse der Agrikulturchemie. Vol. I. (Results of Agricultural Chemical Research.)**

Edited by Dr. F. HONCAMP, Professor at the Agricultural College and Director of the Agricultural Experiment Station at Rostock. Verlag Chemie G. m. b. H., Corneliusstrasse 3, Berlin W 10, Germany, 1929. vii + 281 pp. 38 figs. 15.5 × 23 cm. Price, unbound, M. 17; bound, M. 18.

The first volume of this publication includes a series of papers which deal with the following subjects: Chemistry and Agriculture; The Distribution and Cycle of Iodine in their Significance for Agricultural Soils; Iodine in Plant Nutrition; The Iodine Problem in Animal Nutrition; The Associative Action of Potassium and Sodium in Plant Growth; Soil Cultivation and Fertilization; Chemical and Biological Aims of Modern Fertilization Methods; The Laws Governing the Digestion of Proteins; Discoveries and Practical Considerations Relating to Phosphorus Investigations in Soils; The Lime Reserves in Our (German) Soils; The Determination of the Absorptive Powers of Soils by the Newer Methods; Electrodialysis and the Problem of Soil Acidity Due to Minerals; The Measurement of the Soil Reaction, Conditions Influencing Changes in Reaction, and Biological Appraisal in Soil Management; Discoveries on the Estimation of Lime Needs and the Effects of the Absorptive Powers of Agricultural Soils.

Two or three of these papers deal with fundamental aspects of plant physiology. The balance of them are concerned with subjects and results that, in the reviewer's opinion, add very little that is new to our knowledge. One gets the impression as he reads these papers that at least some circles of agricultural chemists find it difficult to break away from the shackles which have bound the workers in the field known as agricultural chemistry, and from the conservative habits in investigation and thought which have characterized the past generation of agricultural scientists.

CHAS. B. LIPMAN