

NEW BOOKS

Structure des Molécules. (*The Structure of Molecules.*) By VICTOR HENRI, Professor of Physical Chemistry at the University of Zurich. J. Hermann, Librairie Scientifique, 6, Rue de la Sorbonne, Paris, 1925. 122 pp., 34 figs. 16.5 × 25 cm. Price, unbound, 20 fr.

It is significant of the trend of certain branches of present day physical chemistry that this book, consisting of a series of lectures delivered in the amphitheater of the Collège de France, should begin and end with discussions of the structure of the benzene molecule, while much of the intervening matter has to do with the latest developments in atomic physics. The chapter on the polarity of molecules outlines the work of Langevin on the Kerr constant, that of Debye and others on electric dipoles, and that of Born, Heisenberg and others on the deformability of ions. After a brief chapter on the structure of molecules as determined by X-rays, the major portion of the book is devoted to the mechanism of light absorption and the interpretation of the results obtained in the Laboratories of the University of Zurich, where Professor Henri has developed a masterly technique for the study of absorption spectra. This field has been covered in the author's "Études de Photochimie" (1919), but subsequent developments have made this new presentation most useful. Particularly interesting in this day of "excited atoms" is the quantitative study of the states of activation or "predissociation" of a molecule. The quantities treated as the fundamental basis for the construction of the molecular model are the electric moment of the molecule, the degree of symmetry determined by X-rays, the moment of inertia and the interatomic distances obtained from the spectrum, and the frequency of radiation for which the molecule passes into an activated state. The latter portion of the book should have special value for those engaged in the study of molecular structure, while the first part makes available in a summarized form much material that is probably unfamiliar to the more general reader. Because of the essentially speculative character of some of the matter, the reader may find himself at times disagreeing with the conclusions, but cannot fail to be interested and stimulated by Professor Henri's lucid survey of this field, in which he has accomplished so much.

CHARLES P. SMYTH

Contribution à L'Étude de la Distillation des Mélanges Ternaires Hétérogènes. (*Contribution to the Study of the Distillation of Heterogeneous Ternary Mixtures.*) By JEAN BARBAUDY. J. Hermann, Librairie Scientifique, 6, Rue de la Sorbonne, Paris, 1925. 155 pp. 68 figs. 16 × 24.5 cm. Price, unbound, 30 fr.

This work was submitted to the University of Paris as a Doctor's thesis. It consists of two parts; first, a brief but complete résumé of the fundamental theory of heterogeneous equilibria from the standpoint of the

phase rule; and second, a description with the results of two sets of experiments on ternary heterogeneous mixtures, water-benzene-toluene and water-benzene-ethyl alcohol. The reviewer was very favorably impressed with the author's grasp of the subject, particularly with the clear manner in which he applied the methods of the phase rule to his specific problems.

In each of the two ternary mixtures, the respective binary mixtures were studied and the results compared with those in the literature, appreciable deviations being found in certain cases. In view of the fact that the present experiments were carried out with a real understanding of the difficulties involved—witness the interesting and illuminating study of the effect of rate of stirring on the boiling temperature of heterogeneous mixtures—the reviewer is inclined to give credence to the author's data.

This book should be of considerable value to those interested in the design of apparatus for the steam distillation of coal tar light oil, and to those engaged in making absolute alcohol by the benzene distillation process.

CLARK S. ROBINSON

Colloid Symposium Monograph. Vol. III. Papers presented at the Third National Symposium on Colloid Chemistry, The University of Minnesota, June, 1925. Edited by HARRY N. HOLMES, Chairman, Committee on the Chemistry of Colloids, National Research Council, assisted by HARRY B. WEISER, Chairman-Elect. The Chemical Catalog Company, Inc., 19 East 24th Street, New York, 1925. 323 pp. Illustrated. 23.5 × 15.5 cm. Price \$5.00.

This third volume of Colloid Symposium Monographs contains twenty-two articles on the most varied subjects of colloid chemistry. The articles of general theoretical interest are: On the Electrokinetic Potential, by Herbert Freundlich; Molecular Weight and Solution, by Wilder D. Bancroft; Some New Aspects of the Surface Tension of Colloidal Solutions, by P. Lecomte du Noüy; The Distribution and Orientation of Molecules, by Irving Langmuir; An Experimental Study of Emulsification, by Alfred J. Stamm; The Centrifugal Method for the Determination of the Distribution of Size of Particle of Suspended Material, by J. B. Nichols and Henriette C. Liebe. In addition to these, there are articles on Photographic Sensitivity; Catalysis by Silica Gel; Water and Ice; Rennet Coagulation; Bacterial Toxins; Blood Clotting; Aluminum Hydroxide; Lithopone; Soap Solutions; the Slit Ultramicroscope; Rubber Solutions; Crystal Growth.

We found Dr. Sheppard's account of the brilliant tracking down of the sensitizing substance in gelatin emulsions much like a detective story and just as absorbing. Dr. du Noüy's experimental results on crystal growth were extremely interesting, while we were impressed by the power and great possibilities of Dr. Langmuir's method of attack on the problems of molecular distribution and orientation.

ARTHUR B. LAMB

Chemiker-Kalender. (*The Chemist's Calendar.*) Edited by Professor Dr. WALTHER ROTH, Tech. Hochschule, Braunschweig. Julius Springer, Berlin, 1926. Vol. I. vi + 54 pp. Vol. II. iv + 713 pp. Vol. III. iv + 592 pp. Illustrated. 15.5 × 9.5 cm. Price 16.50 RM.

Two important mechanical improvements have been made in this new edition. First, the long overdue alphabetical index has at last been provided, and second, the diary, almanac, notebook and a few of the more important tables have been incorporated in an additional (third) small volume. Moreover, many of the tables have been revised and brought up to date.

With this edition, Professor Roth withdraws from the editorship, after seven years of service during which the "Kalender" has been decidedly enlarged and thoroughly modernized.

ARTHUR B. LAMB

Biological Stains. *A Handbook on the Nature and Uses of the Dyes Employed in the Biological Laboratory.* By H. J. CONN, New York Agricultural Experiment Station. Prepared with the collaboration of J. A. AMBLER, S. I. KORNSHAUSER, F. B. MALLORY and L. W. SHARP, Members of the Executive Committee of the Commission. Published by the Commission, Geneva, N. Y., U. S. A., 1925. 151 pp. 5 figs. 20.5 × 13 cm. Price \$2.00.

This little book is unique in the literature of dyes in that it has been prepared in the interest of the user of biological stains by a committee representing various national scientific societies. It contains a chapter on the history of staining in biology, a very clear chapter on the difficult subject of the nature of dyes, their chemical composition and classification, and a lucid exposition of the principle and technique of spectrophotometric examination of dyes. There follow four chapters devoted to the individual synthetic dye substances, each classified according to chemical structure and designated by a chosen name followed by various synonyms or trade names which have been applied to the same substance. The properties and chief uses in biology are briefly indicated. Another chapter is devoted to compound dyes resulting from a combination of two or more simple dyes, such as the Ehrlich tri-acid stain and the Romanovsky stain; this is followed by a discussion of the natural dyes such as indigo, cochineal and hematoxylin and a short chapter on the theory of staining.

There is a table showing the principal uses of the more important stains, including references to the literature, and the specifications of the Commission for certain stains are also given. The references to original literature and designation of each dye by its index number in Schultz's "Farbstofftabellen" as well as its number in the more recent English "Colour Index" facilitate the identification of each substance.

Preparation and publication of this book represent a distinct service

which should be highly appreciated by all biologists who employ stains. It should help to free us to some extent from blind empiricism and pitiful rule-of-thumb methods in staining.

W. J. MACNEAL

Chemisch-technisches Praktikum. Übungsbeispiele aus der chemisch-technischen Analyse für Studierende an technischen Hochschulen und Universitäten. (Chemico-technical Analytical Procedures. Examples of Methods from Chemico-technical Analysis, for Students in Technical Schools and Universities.) By Dr. Ing. WILHELM MOLDENHAUER, a.o. Professor at the Technische Hochschule at Darmstadt. Second revised and enlarged edition. Gebrüder Borntraeger, W. 35 Schöneberger Ufer 12 a, Berlin, 1925. viii + 264 pp. 49 figs. 25 × 16.5 cm. Price bound, 14, 25 marks.

The author attempts to fill for students what he points out to be a gap in technical literature in the field of chemical-technical analysis. He has given selections from a wide variety of industrial methods. It is difficult for students or even industrialists to get at these methods, without spending an undue amount of time, in the literature. The author very wisely points out that even a teacher, selecting methods from the literature will often make mistakes, or miss the industrial point entirely. The technical man often has the fault of assuming too much knowledge on the part of the reader, since he thinks largely or entirely in terms of others facing similar problems. The author has, therefore, endeavored to reduce such misapprehension to a minimum.

The text leans heavily toward a strictly chemical series of examples and rather slightly divulges the strong leaning of industry to physical methods of testing during the last 30 years. The specific subjects covered are: fuels; water (sanitary and industrial); gas analysis; gas by-products; pyrites; nitro-acids; oleum; explosive materials; bleach; ammonia soda materials; oils, fats and waxes; soaps; glycerol; lubricants; electro-analysis; iron ores; iron ferro-alloys; refinery copper; zinc blende; zinc dust; lead. The customary tables of atomic weights, specific gravities and the like are added. Interesting specialized methods such as that for the separation of sulfate from chloride by benzidine are distributed through the work. Modern graphs are included to illustrate the relation of percentage composition and boiling point of acids, together with phase-rule diagrams and melting-point curves of oleum. Methods of calculation are included in the text, as are illustrations of special apparatus, such as calorimeters and distillation set-up, with dimensions. The arrangements of special chemical devices are given where required by the text. References to the literature are entirely missing. The American tendency of standardization to fit with specifications is missing.

The author presents an interesting form of mercury cathode for electro-analysis, devised by himself. The mercury is contained in a sort of

right-angled ladle or spoon, through the handle of which runs the connecting platinum wire. This is convenient for insertion into the solution, as with flag or gauze cathodes. It is the experience of the reviewer, however, that serious loss of mercury from splashing would result from the handling of such a cathode. It can give, therefore, only crude results in the hands of beginners, and even experienced operators would have difficulty with it.

The book under review would be available to German reading students only. The illustrations are widely distributed over the industries and the volume would make an excellent reference book for advanced students and for industrial laboratories. The book is serviceably bound in soft, semi-flexible brown buckram. The paper is of good, smooth calendered stock with clean-cut type, making a neat and highly pleasing appearance typical of so many German scientific works.

JAMES R. WITHROW

Allen's Commercial Organic Analysis. Vol. IV. Special Characters of Essential Oils, E. K. NELSON and G. A. RUSSELL; Resins, ERNEST J. PARRY; India Rubber, Gutta Percha, Balata and Allied Substances, JOHN B. TUTTLE; The Constituents of Essential Oils and Allied Substances, ERNEST J. PARRY; General Characters and Analysis of Essential Oils, ERNEST J. PARRY. Fifth edition, entirely rewritten. Edited by S. S. SADTLER, E. C. LATHROP and C. A. MITCHELL. P. Blakiston's Son and Company, 1012 Walnut Street, Philadelphia, Pennsylvania, 1925. x + 648 pp. 9 figs. 24 × 16 cm. Price \$7.50.

The fourth volume of the new fifth edition of "Allen" replaces Volume IV of the fourth edition which was published in 1911 and covers the same subjects. Mr. Parry is the only contributor who served also in the preparation of the previous edition. The latest volume has 648 pages as compared with 466 in the earlier edition, but the thickness of the volume has been appreciably reduced by the use of thinner and better paper. The revision has been substantial and fully maintains the high standard set in the earlier volumes of the new edition. A discussion of products omitted from the earlier edition, including many of considerable industrial importance, has been added in this new edition.

In the chapter on rubber the part dealing with the analysis of vulcanized rubber goods has been considerably revised, but the rest of the chapter is little altered. Since the fourth edition was published the rubber industry has undergone great changes through the replacement of wild rubbers by plantation rubber, the general introduction of organic vulcanization accelerators, and the beginning of the importation of rubber latex for direct use in manufacture; but these radical industrial changes have made very little impress on this book. Thus, the section dealing with the analysis of rubber latex is quoted verbatim from the earlier edition, including an example "which represents a (somewhat abnormal) sample of

Funtumia elastica latex." But no typical analysis of Hevea latex, such as is now available to the industry, is quoted. The reader will also look in vain for methods of detecting the nature or amount of accelerators used, although the author cannot be fairly criticized for this deficiency because rubber chemists have as yet published very little on this difficult problem. The technique and significance of physical methods of testing rubber, such as the determination of tensile strength and elongation and electrical properties, are also omitted.

There are numerous duplications between this volume and Chapter 6 of Volume III.

If the reader desires to look up "Zingiberol" in the index he will miss it entirely, and perhaps, like the farmer who visited the circus and saw a giraffe for the first time, concluded that "there ain't no sich animal," unless he is learned enough to know in advance that it is an alcohol derived from a sesquiterpene hydrocarbon. But fortified with this intelligence he can look under "alcohols," and then under the subhead "of sesquiterpenes" and find the elusive zingiberol safely corralled. On the other hand, any reasonably good speller can find the mother "zingiberene" in her proper alphabetical place in the index without necessarily knowing that she is a member of the hydrocarbon family. If warned by this experience he should look for "chavibetol" under alcohols he would miss again, until some inspiration suggested that he try under "Phenolic constituents of essential oils." Heliotropin is indexed only under "Aldehydes" and its synonym "piperonal" is not indexed at all; whereas vanillin, which is just as good an aldehyde as heliotropin, is not indexed under the "Aldehydes" but only under "Vannilin" (sic); and vanillin is discussed at much greater length in Volume III of this set, but there is no cross reference in the index to Volume IV.

If these cases were the total result of a long microscopic search, it would be petty to mention them because even the best of indexers are human and can be excused for a few errors. But, on the contrary, a half hour's inspection of the index has shown that these cases are typical of the slipshod method used in preparing the index. In a reference book of this character a poor index very largely destroys the value of the book. It is earnestly to be hoped that the editors will provide a really good index to the entire set when it is finished.

GRINNELL JONES