

unburned layer of gas. Somewhere between ignition and the wall, detonation sets in. The detonation wave is reflected from the wall and returns toward the center, compressing the partially burned gases and completing the combustion. Two questions arise: (1) Does the impact of the detonation wave on the diaphragm pressure indicator contribute to the maximum pressure and thus modify an otherwise static recording? (2) Is the magnitude of the maximum pressure affected by the location and therefore speed of the detonation wave at the moment it is recorded?

Information on these points may be obtained in the following way. It is known that the velocity of the detonation wave in a mixture $2\text{H}_2 + \text{O}_2 + 5\text{He}$ is about twice as great as in a mixture $2\text{H}_2 + \text{O}_2 + 5\text{A}$ [Bernard Lewis and J. B. Friauf, *THIS JOURNAL*, **52**, 3905 (1930)]. Argon and helium have the same specific heats and they do not affect the equilibria at explosion temperatures. If the explosion method is yielding correct results under all conditions, the explosion of argon and helium mixtures should give identical maximum pressures and therefore the same specific heat of water vapor.

It would be desirable to obtain specific heat measurements in various mixtures of hydrogen and oxygen in all of which the velocity of the detonation wave is the same. This can be realized by the addition of suitable amounts of argon or helium, or mixtures of the two inert gases. It is also desirable to study the effect on specific heats of varying the type, size and material of the diaphragm pressure indicator and the explosion chamber.

In view of the importance of high temperature specific heats and the fact that the explosion method is the only one available for their determination, such fundamental studies are now in progress in this Laboratory.

EXPLOSIVES SECTION
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BERNARD LEWIS²

NEW BOOKS

A Quarter Century of Learning, 1904-1929, as Recorded in Lectures Delivered at Columbia University on the Occasion of the One Hundred and Seventy-Fifth Anniversary of its Founding. Columbia University Press, 2960 Broadway, New York, 1931. vi + 380 pp. 15.5 × 23 cm. Price, \$3.50.

In this book, eighteen professors of Columbia University "survey the progress of learning during the past twenty-five years"; each professor contributes a chapter on his own special field of learning.

The subjects discussed are the following: history, economics, sociology, government, jurisprudence, psychology, education, college administra-

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tion, letters, classical studies, architecture, biology, medicine, chemistry, physics, engineering and geology. The chapter on physics (29 pp.) is contributed by Professor George B. Pegram, and that on chemistry (15 pp.) by Professor Henry C. Sherman.

In the chapter on chemistry Professor Sherman writes: "One way of expressing the present trend in science is to say that physics becomes more mathematical, chemistry more physical, biology and geology more chemical. * * * * *The two great trends* (in chemistry) are: an ever-increasing exactness; and a broadening toward, and an interpenetration with, the neighboring sciences. The two-fold result is simultaneous growth both in breadth of view and in depth of insight."

The general reader will find the book interesting and instructive.

WM. MCPHERSON

Science in Action. A Sketch of the Value of Scientific Research in American Industries.

By EDWARD R. WEIDLEIN AND WILLIAM A. HAMOR, Mellon Institute of Industrial Research, Pittsburgh, Pa. McGraw-Hill Book Company, Inc., 370 Seventh Ave., New York, 1931. xiii + 310 pp. Illustrated. 15 × 23.5 cm. Price, \$3.00.

This is a unique book. It gathers together in one volume a mass of material which has hitherto been scattered through a great many publications in the fields of science, business, commerce, management and economics.

The book is divided into the following parts: (1) The Past and Present Condition of Industrial Research; (2) Science and Human Welfare; (3) Science in the Industries; (4) Science, the Pilot of Technology; (5) Scientific Management and Rationalization; (6) Industrial-Research Methods and Men. Each of these topics is covered in a thorough and scholarly manner and the wealth of specific examples to drive home the general truths is as full as one would expect from the ample experience of the authors in their work at the Mellon Institute during the past fifteen years.

It would be well if every industrial leader and worker in science were to read this book. It would lead to better understanding and appreciation on both sides. As one reads the book, one wonders why there are not Industrial Experiment Stations in every State. Though we are now primarily an industrial nation, we have not yet arrived at the stage in which those in authority have seen fit to supplement the excellent work of our Agricultural Experiment Stations with similar institutions to meet the needs of our industries. Incidentally, the future historian will find a truer picture of our age in a book such as this than in the speeches and debates of politicians and "statesmen."

This is a book which can also be safely recommended to non-technicians whose interest in the significance of science in modern life has been aroused. Here is abundance of fact, authoritatively stated and attractively presented.

FREDERICK E. BREITHUT

General Chemistry, Theoretical and Descriptive. By THOMAS P. McCUTCHEON, Ph.D., HARRY SELTZ, Ph.D., AND J. C. WARNER. Second edition. D. Van Nostrand Company, Inc., 250 Fourth Ave., New York, 1931. xvi + 533 pp. Illustrated. 14 × 22.5 cm. Price, \$3.50.

In this second edition the authors have retained their division of the subject into two parts, theoretical and descriptive. The main changes involve more use of atomic structure and the Periodic System.

The text should appeal to the teacher who prefers to have the facts of descriptive chemistry in concise form, enabling him to inject "his own method and personality into the course." The syllabus of lectures shows that the authors take up descriptive and theoretical parts simultaneously in the conventional manner, rather than devoting the entire first semester to theoretical chemistry.

Atomic weights are determined before molecular weights by using the Rule of Dulong and Petit. Atomic structure and electron arrangement seem to be adequately discussed. The authors apparently feel that there is sufficient justification for explaining chemical properties by means of atomic structures but they have refrained from carrying the idea into the descriptive part of the text except for brief statements and tables showing electron arrangement.

A. J. SCARLETT, JR.

Strukturbericht, 1913-1928. (Structure Summary, 1913-1928.) By P. P. EWALD AND C. HERMANN. Supplementary Volume, *Zeitschrift für Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie*, founded by P. v. Groth; edited by P. Niggli, P. P. Ewald, K. Fajans, M. v. Laue. Akademische Verlagsgesellschaft m. b. H., Schlossgasse 9, Leipzig C 1, Germany, 1931. v + 818 pp. Illustrated. 16 × 24 cm. Price, unbound, RM. 45; bound, RM. 47.

This extremely valuable summary provides a critical discussion of all studies of the structure of crystals by x-ray methods published before the end of 1928, and of some later ones (to February, 1931). Detailed abstracts of over two thousand papers dealing with a thousand substances are given in such a form as to show the reliability and accuracy of the structure determinations. These abstracts compose about half the book, the remainder consisting of a summary according to "types"; that is, distinct structures, which provides a very convenient and useful survey of the work which has been done. For each of the 121 types there are given a set of atomic coordinates, a figure showing the arrangement of atoms in the unit, a discussion of the space-group symmetry, a list of the principal interplanar distances and the sequences of atom-planes, a table showing the way each atom is surrounded by other atoms (usually also shown graphically in stereographic projection), and a table of numerical values for the substances belonging to the type, including the principal interatomic distances. The information is, in general, more extensive

than that included in the original papers. All calculations of interatomic distances and other derived quantities have been made by the authors, who have also designed the 286 figures in such a way as to permit the easy visualization of the structures.

The "Strukturbericht" is the standard crystal structure reference book and should be in every chemical and physical library.

LINUS PAULING

Richter-Anschütz Chemie der Kohlenstoffverbindungen oder organische Chemie. (Organic Chemistry or the Chemistry of the Compounds of Carbon.) Edited by Dr. RICHARD ANSCHÜTZ. Twelfth edition. Volume III. Heterocyclic Compounds. By Dr. FRITZ REINDEL, Professor of Chemistry at the Technical High School of Munich. Akademische Verlagsgesellschaft m. b. H., Markgrafenstrasse 4, Leipzig C 1, Germany, 1931. ix + 413 pp. 16 × 24 cm. Price, M. 26, unbound; M. 28, bound.

The eleventh edition of the Richter-Anschütz appeared in two volumes of which one dealt with open chained, the other with cyclic compounds. In the new edition it has been found expedient to present the material on cyclic compounds in two volumes. One of these volumes—number III treating heterocyclic compounds—is now at hand, and the other is promised within a year.

Of the third volume it is probably sufficient to say that it meets the expectations that were raised by the first. The material has been selected with great care and it is presented with skill. Moreover, the difficult chapters on the pyrroles and on the opium alkaloids may be accepted as authoritative because they have been examined critically by Hans Fischer and Clemens Schöpf.

E. P. KOHLER

An Introduction to Biochemistry. By ROGER J. WILLIAMS, Ph.D., Professor of Chemistry, University of Oregon. D. Van Nostrand Co., 250 Fourth Ave., New York, 1931. xiv + 501 pp. Illustrated. 14 × 22.5 cm. Price, \$4.00.

The book has a very comprehensive scope and is written in a very popular style. It covers the entire field of biochemistry in all its aspects. The material is arranged in four sections. Of the 440 pages of text, 153 are devoted to a discussion of the chemistry of tissue constituents and of the colloidal properties of some of them. This constitutes the first section of the book. The remainder of the book is devoted to what may be called "chemical physiology." The second section, which is a general consideration of nutritional requirements, occupies 26 pages. The third section, dealing with the mechanisms used by organisms, in general, for promoting and regulating chemical change, occupies 34 pages and the remaining 200 pages are devoted to the discussion of the problems of metabolism.

It surely is a very difficult task to condense in a non-technical way the fundamentals and the most modern achievements of so broad a subject but the author has acquitted himself in his undertaking in a very creditable manner.

In the section devoted to structural chemistry none of the more important problems that engages the attention of present-day investigators has been omitted although there is noted a considerable unevenness in the discussion of individual problems. Thus, the structure of sugars and of their derivatives is given in considerable detail, whereas the entire subject of hemoglobin is limited to the graphic formula of hemin. Incidentally, the structure of nucleic acid as given on page 96 is not entirely correct. All in all, however, the reviewer discovered few errors.

Very commendable is the plan of the chapters on Nutritional Requirements and on Metabolism. The author begins each section with a discussion of the problem in its application to the lowest living organisms. Thus, there are chapters on nutrition of bacteria and fungi, green plants, lower animals and, finally, mammals.

The author has accomplished well the task that he set for himself, namely, to give a popular summary of present-day information on what he terms the "chemistry of organisms." The book will be read with interest not only by the undergraduate student but also by the layman having a curiosity as to the chemical events in organisms.

P. A. LEVENE

Die Glykoside. Chemische Monographie der Pflanzenglykoside. (The Glucosides. A Monograph on the Chemistry of Plant Glucosides.) By Dr. J. J. L. VAN RIJN. Second revised and enlarged edition by Dr. HUGO DIETERLE, Professor of Pharmaceutical Chemistry and Director of the Pharmaceutical Institute of the University of Frankfurt-on-Main. Verlag von Gebrüder Borntraeger, W 35, Schöneberger Ufer 12a, Berlin, Germany, 1931. viii + 620 pp. 16 × 25 cm. Price, unbound, M. 48; bound, M. 51.

The chemistry of naturally occurring substances has been in such constant state of extension that works of reference require frequent revision and expansion. The new edition, therefore, of van Rijn's monograph on plant glucosides, coming as it does thirty years after the first edition and extensively rewritten by Professor Dieterle, will prove a useful book of reference. Contrary to the original work, the synthetic glucosides are wisely omitted and only the natural plant glucosides are described. The order of presentation of the individual substances has been retained, *i. e.*, according to the plant families in which they are found, and admittedly not an ideal arrangement. Under the heading of the individual glucosides which have been isolated, the formula is given. This is followed by a description of their occurrence, distribution and mode of isolation from the

plant material. The properties and chemistry of the glucosides are then presented as well as that of their hydrolytic products or aglucones. In many cases the pharmacological action of the individual glucoside is mentioned.

However, the size of the book limits its scope. Otherwise, because of the variety and complexity of the substances involved, a fuller as well as more faithful and discriminating presentation of their chemistry could better be accomplished by a larger work under the joint authorship of a number of specialists. It is a question whether quite so much space in the present work should be given to artificial derivatives such as those of salicin, perhaps at the expense of a fuller discussion of structural investigations on more complicated substances. The present work, however, gives a very useful outline which must be supplemented by recourse to original articles. For this purpose the bibliography given will prove very helpful. The material presented is not complete beyond the beginning of 1926, although the author has included some work which appeared several years later.

WALTER A. JACOBS

Handbuch der biologischen Arbeitsmethoden. (Handbook of Biological Methods.)

Edited by Professor Dr. EMIL ABDERHALDEN. Section 1. Chemical Methods. Part 2, 2d half, Number 8. Dehalogenieren. (Dehalogenation.) By HUGO BAUER, Frankfurt a. M. Urban and Schwarzenberg, Friedrichstrasse 105b, Berlin, Germany, 1931. 108 pp. 17.5 × 25.5 cm. Price, RM. 5.50.

This number of the Abderhalden treatise gives a résumé of the different methods and reagents that are available for removing halogen atoms from organic compounds—by eliminating them as halogen acid, replacing them with hydrogen or hydroxyl or removing them in pairs from adjoining carbon atoms. The author describes not only the methods in common or occasional use in the laboratory but also those which have been found useful in the industries. Each method is supplied with examples that illustrate details of procedure, and the sections dealing with similar groups of reagents frequently begin with a general discussion of underlying principles. The work is well done and it seems to be complete.

E. P. KOHLER