

in the literature. In general, when the ethoxy group is on a methylene group in position 2 or 4 or directly on the ring in position 5, these pyrimidines form nitrates which resemble the Windaus' oxidation product [*Z. physiol. Chem.*, **228**, 28 (1934)]  $C_7H_{11}N_3O_5$ , in absorption [Smakula, *ibid.*, **230**, 231 (1934)] and in solubilities. We infer that Windaus' product has the structure III but have not been able as yet to effect a synthesis for confirmation. Nitric acid is evidently not added across the double bond in positions 4-5 as in oxy-nitrothymine as such addition grossly modifies absorption.

We have long been delayed by misinterpretation of some earlier results. First, the formyl derivatives of 5,6-diaminopyrimidines exhibit absorption resembling that of the vitamin. This we now regard as fortuitous. Second, we ob-

tained crystalline formamidine (hitherto unknown) by fusing the amino sulfonic acid with sodamide. Formamidine is apparently not derived from the ring as we once supposed but probably from the methylene bridge. At another time we obtained a cleavage product with absorption indicative of a 4,6-diaminopyrimidine, the second amino group, as we now see it, being introduced by reaction rather than preëxisting in the vitamin. Following these false leads, we have attempted the synthesis of various isomers of the vitamin with considerable success but with uniformly negative physiological results and are now engaged in devising a synthesis of structure I.

Abundant activity has been obtained in such a synthetic reaction mixture.

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R. R. WILLIAMS

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## NEW BOOKS

**Dictionary of Organic Compounds. Volume II: Ecaine-Myrtilin Chloride.** Edited by I. M. HEILBRON, D.S.O., D.Sc., Ph.D., F.I.C., F.R.S., Sir Samuel Hall Professor of Chemistry, University of Manchester, and H. M. Burnbury, M.S.C., A.I.C., Imperial Chemical Industries Ltd. Oxford University Press, 114 Fifth Avenue, New York, 1936. 846 pp. Price \$30 or \$75 for the set of three volumes.

The spontaneous and flattering reception accorded the initial volume of the "Dictionary of Organic Compounds" may be construed as a verdict that Heilbron's new contribution to the classification of carbon compounds will be ranked in importance along with Beilstein and Richter. That the authors are greatly encouraged "to maintain and even enhance the standard attained" in Volume I is attested by the fact that Volume II, which has just been issued by the Oxford University Press, "although originally intended to be of approximately the same size as Volume I, actually contains nearly 150 pages more."

Several outstanding features of the English work make a strong appeal: its relatively low cost; the alphabetical classification with the obvious advantage where ready reference is concerned; the inclusion under each compound listed of all descriptive data and functional derivatives ordinarily desired; the limited number of selected literature references which means a great saving in time where unessential detail is not demanded; and, finally, a review of the literature through the year prior to the date of publication of each volume.

Before the appearance of Heilbron, abstract journals were relied on in large part to supplement Beilstein in the preparation of up-to-date bibliographies. In this connection the following announcement in the Preface of the second volume is of interest: "No addendum has been found necessary, since the literature has been completely covered up to the end of 1934. Opportunity has been taken to add as many 1935 references as the exigencies of going to press would allow."

The benefits of an authoritative lexicon like Heilbron are well exemplified by the structural relationships of recent development among the coloring pigments in plant life. Here a mass of xanthenes, flavones, flavonols and anthocyanidins have been isolated from natural sources and their complex structures established. A picture of the wonderful revelations in this important domain of organic chemistry is presented only when one can visualize the recently cleared-up substitutions and molecular rearrangements which are concerned in the metamorphosis of one product to another. What applies here is true all through Organic Chemistry; in the past few years many new fields have been explored and the accumulation of new facts has been so rapid that only the specialist in each particular domain can qualify as an authority in his realm.

Of necessity, in Heilbron, where will be crowded a vast subject matter into three volumes, will not be found thousands of known organic compounds. The only work which now embraces or probably ever will embrace an exhaustive survey is Beilstein. But here there exists at present a

hiatus from 1919 to 1936 which will broaden materially during the completion of the fourth edition; as a matter of fact, the ever increasing bulk of the subject means that in the future journal publications will have to await many years for citation in Beilstein. The assurance that through Supplements new discoveries will be incorporated without undue delay stamps the Dictionary as an indispensable reference work of the future for which no adequate substitute is available.

The editorial staff and the publishers are to be congratulated on the correctness of the literature references, the attention given to the accuracy of the descriptive data and the comparative lack of typographical errors.

Chemists the world over will accord unstinted praise to Heilbron's Dictionary and welcome the appearance a year hence of the concluding volume.

J. R. BAILEY

**Schwimm-aufbereitung.** (The Flotation Concentration of Minerals.) By W. PETERSEN, Lecturer at the Mining College at Freiberg (SA.). Verlag von Theodor Steinkopff, Residenzstrasse 32, Dresden-Blasewitz, Germany, 1936. xii + 337 pp. 93 figs. 15 × 22.5 cm. Price, RM. 18; bound, RM. 19.50.

This monograph presents a well documented account of the application of physico-chemical principles to the separation of valuable minerals from their accompanying gangue minerals. It reviews the significant literature up to 1933. More than half of the text material is concerned with the theoretical aspects of surface chemistry as applied to modern flotation practice. The current methods of flotation of the various minerals are given in tabular form after the general discussion of the reagents used in the flotation of the several groups of minerals.

The author knits together the theoretical and experimental work of surface chemistry with the actual flotation of the minerals. He has accomplished his purpose in a remarkably clear and well organized manner. His ability to condense and correlate the substance of the eight hundred and fifty-nine separate papers, listed in the bibliography and referred to in the text, is in itself unusual and commendable.

The book will be indispensable to all those interested in surface chemistry, and especially to those who are engaged in practical mineral flotation.

C. C. DEWITT

**Sulfuric Acid Manufacture.** By ANDREW M. FAIRLIE, Consulting Chemical Engineer. American Chemical Society Monograph. Reinhold Publishing Corporation, 330 West 42d Street, New York, N. Y., 1936. 669 pp. 192 figs. 15.5 × 23.5 cm. Price, \$9.75.

This book gives an authoritative and up-to-date account of the manufacture of sulfuric acid by both the nitration and contact methods with special emphasis on industrial practice in America.

For the sake of abbreviation the author has omitted descriptions of obsolete, abandoned procedures and of patented processes or equipment which have never been

reduced to industrial practice. The book definitely gains in clarity and usefulness by this restriction for all users except patent attorneys or others interested in the novelty or patentability of variations from the established practice.

The book gives a detailed and clear description of methods now in use and of the principles of design of the apparatus. It is illustrated by many excellent photographs and drawings and statistical charts. The style is clear and forceful. The discussions as to the trends in the industries with definite predictions as to probable future developments are especially interesting and stimulating.

The book clearly ranks among the very best books on industrial chemistry. The Editors of the Monograph Series of the American Chemical Society are to be congratulated on this splendid addition to their list.

GRINNELL JONES

**Cours de Chimie Industrielle.** (Industrial Chemistry.)

By G. DUPONT, Professor in the Faculty of Sciences at the University of Paris. Gauthier-Villars, Éditeur, 55 Quai des Grands-Augustins, Paris, France, 1936. Vol. I, vi + 184 pp. Vol. II, ii + 337 pp. 16 × 24.5 cm. Price, fr. 35 + 55.

This is a brief and quite elementary textbook of industrial chemistry. Volume I discusses unit processes of chemical engineering (64 pages) and fuels (110 pages). The second volume is devoted to inorganic chemical industries (315 pages). It is announced that a third volume to be published later will cover metals and alloys, and fourth and fifth volumes will deal with the organic chemical industries. Many inorganic industries are omitted altogether, including mineral pigments, insecticides, aluminum sulfate, chromates, barium salts, potassium permanganate and trisodium phosphate. A few lines are devoted to perborates, but the much more important borax and boric acid industries are omitted. The drawings are numerous and crude, and highly diagrammatic. The book is far from being up-to-date if judged by comparison with the American chemical industries. For example, there is no allusion to the direct absorption of ammonia by superphosphate of lime; and the manufacture and uses of bromine are discussed without mention of its direct recovery from ocean water or its use in making ethylene dibromide for use in "ethyl gasoline."

The book may be recommended to American chemical students as a means of learning chemical French. The style is clear, there are few unnecessary indefinite adjectives, and the chemical vocabulary is varied.

GRINNELL JONES

## BOOKS RECEIVED

April 15, 1936–May 15, 1936

EMIL ABDERHALDEN, Editor. "Handbuch der biologischen Arbeitsmethoden. Abt. IV. Fermentforschung. Teil 1/2, Heft 10." Urban und Schwarzenberg, Friedrichstrasse 105B, Berlin W 24, Germany. 206 pp. RM. 13.