TABLE I

POLARIZATION DATA FOR DIOXANE SOLUTIONS OF AMINOBENZOIC ACIDS

Mole fraction	ϵ^{25}	d^{25}_4	$n^{25}D$	P_2
		Ortho		
0.0000	2.23025	1.02689	1.41990	
.00510	2.24795	1.02857	1.42143	90.0
.012868	2.26766	1.03134	1.42356	82.7
.020991	2.28782	1.03406	1.42581	80.3
		Meta		
0.0000	2.22661	1.02681	1.41990	
.002963	2.26603	1.02817	1.42101	188.8
.006905	2.30146	1.02933	1.42181	183.5
.009591	2.32697	1.03029	1.42256	177.6
		Para		
0.0000	2.22661	1.02681	1.41990	
.006280	2.33950	1.02933	1.42190	291.2
.014378	2.47570	1.03234	1.42487	280.1
.019724	2.55689	1.03436	1.42624	267.4

tion have indicated[1,6] that they differ considerably in the extent to which they exist in the polar amphoteric form, the meta acid being the only one which is predominantly of the zwitter-ion type, its solutions showing characteristically different behavior from the others.

(6) Devoto, *Z. Elektrochem.*, **40**, 490 (1934); Halbedel, *Z. physik. Chem.*, **33B**, 83 (1936).

TABLE II

DIPOLE MOMENTS OF AMINOBENZOIC ACIDS (DEBYE UNITS)

Acid	∞P_2	R_2	$P_E + P_A$	μ, obsd.	μ, calcd.	μ, ester
Ortho	91.5	39.7	43.7	1.51	1.73	1.00
Meta	194.5	39.0	42.9	2.70	2.95	2.40
Para	301.5	40.6	44.7	3.51	3.40	3.30

In the non-polar solvent dioxane, on the other hand, it assumes the expected intermediary position between the para- and ortho-. This may be shown by a rough calculation of the moment by the method of Williams involving vector addition,[7] the results of which are shown in Table II, column 4. In making them a value of -1.9 is assigned to the carboxyl group and $+1.5$ to the amino group. Such simple assumptions cannot be applied quantitatively to structures as complicated as these molecules since they neglect the effects of valency angles, rotation, resonance, etc. Qualitatively, however, they are useful in illustrating the effect of polarity of the solvent upon the behavior of the meta acid.

(7) Williams, THIS JOURNAL, **50**, 2350 (1928).

DEPARTMENT OF CHEMISTRY
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NEW BOOKS

Organic Syntheses. An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. Vol. XIX. By JOHN R. JOHNSON, *Editor-in-Chief*, HOMER ADKINS, C. F. H. ALLEN, W. E. BACHMANN, N. L. DRAKE, R. L. SHRINER, LEE IRVIN SMITH and A. H. BLATT, *Secretary*. John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y., 1939. vi + 105 pp. 15.5 × 23.5 cm. Price, $1.75.

The present volume, like the preceding one, is in harmony with the contemporary interest in biochemistry. As a reviewer of this volume (G. Bryant Bachman) recorded in a recent number of our News Edition, "it is interesting to note that 17 of the 30 preparations described are of nitrogen compounds." The methods of preparation have all been carefully tested. In a few instances—as in preparations IX, XXII, XXV, and XXX—a brief statement is given concerning the specific usefulness of the compound. Some of us, I am sure, would be glad to see an extension of this desirable feature.

The list of the new preparations is as follows: α-acetaminocinnamic acid, acetylglycine, acridone, 2-amino-4-methylthiazole, benzimidazole, benzohydroxamic acid, ε-benzoylamino-α-bromocaproic acid, ε-benzoylaminocaproic acid, ω-bromoacetophenone, *n*-butyl sulfate, *n*-butyl sulfite, copper chromite catalyst, cyclohexylbenzene, dichloroacetic acid, *p*-dinitrobenzene, ethyl benzoyldimethylacetate, ethyl hydrogen sebacate, hexamethylene glycol, 5-iodoanthranilic acid, iodobenzene, *m*-iodobenzoic acid, *dl*-lysine hydrochlorides, methyl nitrate, *dl*-β-phenylalanine, *o*-phenylenediamine, phenylnitromethane, phenylpyruvic acid, *p*-thiocyanodimethylaniline, 1,2,3-triiodo-5-nitrobenzene, triphenylmethylsodium.

M. GOMBERG

Chemie der Zucker und Polysaccharide. (Chemistry of Sugars and Polysaccharides.) By FRITZ MICHEEL, Professor of Organic Chemistry at the University of Münster (Westfalen). Akademische Verlagsgesellschaft m. b. H., Sternwartenstrasse 8, Leipzig C 1, Germany, 1939. xvi + 399 pp. 16 × 23.5 cm. Price, RM. 26.80; bound, RM. 28.40.

The author, whose important carbohydrate researches are well known, has now published one of the best treatises dealing with this field. The chemistry of the sugars, with

main emphasis on the structural and stereochemical side, is presented thoroughly, logically and concisely, with a wealth of literature references. In addition, there are short chapters concerning starch, cellulose and other polysaccharides, biochemical aspects of carbohydrates, and industrial utilizations. A scholarly selection of those topics in which knowledge is now certain, a thorough but concise and objective presentation of matters which still admit of doubt, combined with a precise yet lucid style of writing, have enabled the author to condense the essentials of the subject into such compass that the book can well be recommended as a text for a one-year course in carbohydrate chemistry. It is also valuable as a reference book because of its clear critical judgments and its literature references.

C. S. HUDSON

Qualitative Organic Chemistry. By NEIL CAMPBELL, Lecturer in Organic Chemistry, University of Edinburgh. D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York, N. Y., 1939. ix + 231 pp. Illustrated. 14 × 20.5 cm. Price, $2.60.

The book is divided into two approximately equal parts. Part A comprises six brief chapters dealing with: (1) Isolation and criteria of purity of pure compounds, (2) Preliminary tests and general procedure for identification of organic compounds, (3) Supplementary and color tests, (4) Choice of derivatives, (5) Preparation of derivatives, (6) Examination of mixtures. It is both interesting and significant that of 57 references cited in the chapter on derivatives 68% are to journals of American origin, while only 3 (*i. e.*, 4%) are to German publications.

Part B consists mainly of 94 pages of tables of compounds. These are arranged by liquids and solids under each of the following headings (numbers indicate the numbers of individual compounds discussed).

Paraffins and cycloparaffins (8), unsaturated hydrocarbons (9), aromatic hydrocarbons (30), halogen derivatives of the hydrocarbons (58), nitro compounds (25), halogen-nitro compounds (18), alcohols (31), phenols (19), halogeno- and nitro-phenols (17), ethers (23), cyclic ethers (3), aldehydes and ketones (52), halogeno- and nitro-carbonyl compounds (12), quinones (8), carbohydrates (14), glycosides (4), carboxylic acids (58), halogeno- and nitro-carboxylic acids (19), acid anhydrides (9), esters (46), esters of inorganic acids (9), acid chlorides (10), amides, imides and ureas (32), nitriles (14), amines (primary and secondary) (39), amines (tertiary) (9), halogen substituted amines (13), nitro amines (14), hydroxy- and alkoxyamines (9), anilides and toluidides (50), amino acids (14), phenylhydrazines (10), nitroso-, azoxy-, hydrazo- and azo-compounds (13), heterocyclic compounds (23), aromatic sulfonic acids (7), substituted sulfonic acids (15), sulfonyl chlorides (6), sulfonamides (6), thioamides (3), and finally isothiocyanates (8).

Part B also includes the usual explanatory material, a general index, author index (136 entries) and an alphabetical index of compounds given in the tables. A count of this last index indicates that 755 compounds have been included. Within each of the solid and liquid sections the compounds are arranged in increasing order of m. p. or b. p., respectively, their values being rounded off to even degrees in each case. For most of the compounds one or two derivatives are suggested (not three for each as stated by the publisher in an extravagantly worded current advertisement); occasionally a very brief remark calls attention to a specific property. For many of the liquids (but by no means all) values of density are given to three figures.

The book is intended primarily for students taking a course in organic qualitative analysis. It will prove useful and stimulating for short elementary courses in this field.

ERNEST H. HUNTRESS

BOOKS RECEIVED

September 15, 1939–October 10, 1939

RALPH E. DUNBAR. "Visual Outline of General Chemistry." Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 348 pp.

CARL J. ENGELDER. "Calculations of Quantitative Analysis." John Wiley and Sons, Inc., 440 Fourth Ave., New York, N. Y. 174 pp. $2.50.

KARL JELLINEK. "Kurzes Lehrbuch der Physikalischen Chemie." Heft II. N. V. Uitgevers-Maatschappij AE. E. Kluwer, Deventer, Netherlands. 252 pp. Dutch fl. 7.50.

HYMAN LEVY. "Modern Science. A Study of Physical Science in the World Today." Alfred A. Knopf, Inc., 501 Madison Ave., New York, N. Y. 736 pp. $5.00.

FREDERICK GEORGE MANN AND BERNARD CHARLES SAUNDERS. "Introduction to Practical Organic Chemistry." Longmans, Green and Co., 114 Fifth Ave., New York, N. Y. 191 pp. $1.50.

E. H. FRITZMAN, Editor. "D. I. Mendeléeff Literary Heritage." Vol. I. Edition of the Leningrad State University, Leningrad, U. S. S. R. 25 pp.

ARTHUR R. MIDDLETON AND JOHN W. WILLARD. "Semimicro Qualitative Analysis." Prentice-Hall, Inc., New York, N. Y. 446 pp. $3.50.

F. J. MOORE. "A History of Chemistry." Third edition. McGraw-Hill Book Co., Inc., New York, N. Y. 447 pp. $3.00.

WILH. SCHLENK. "Ausführliches Lehrbuch der organischen Chemie." II Band, Franz Deuticke, Vienna, Germany. 896 pp. RM. 30. Bound RM. 33.

"Gmelins Handbuch der anorganischen Chemie." Edited by E. PIETSCH. 1 Ergänzungsband, Teil 1. "Aluminum Legierungen Patentsammlung," by G. Apel. Verlag Chemie G. m. b. H., Berlin W 35, Germany. 880 pp. RM. 72.

"Minerals Yearbook, 1939." H. HERBERT HUGHES, Editor. Superintendent of Documents, Government Printing Office, Washington, D. C. 1422 pp. $2.00.