

lent to 29% of the original defatted corn starch. After prolonged Soxhlet extraction with methanol, its iodine affinity was 14.5%. The non-precipitated fraction (presumably of branched molecular configuration) was isolated by treating the centrifugate with several volumes of methanol. After extraction with methanol, its iodine affinity was less than 0.2%.

Since traces of higher fatty acid will prevent the adsorption of iodine, cereal starches must be exhaustively defatted before potentiometric evaluation of iodine affinity. The proportion of linear-chain component in corn starch can be approximated by dividing the iodine affinity of defatted corn starch (*viz.*, 5.3%) by that of the repeatedly recrystallized butanol-precipitated fraction (*viz.*, 19.0%). This gives a calculated amount of 28% linear-chain component in corn starch, substantially higher than the amount previously reported by selective precipitation with butanol,

but in excellent agreement with values more recently obtained by improved precipitation methods with certain of the amyl alcohols. These new procedures will be reported in the near future.

Taylor and his co-workers<sup>4</sup> presumed the so-called  $\alpha$ -amylose of corn starch to be the fatty acid ester of a carbohydrate. It is now apparent that this material was part of the linear-chain starch fraction, rendered polar through adsorption of natural fatty acids in the corn starch and hence migrating in the electrophoretic cell. On the basis of present information, it is presumed that the natural fatty acids in corn starch are adsorbed on the linear-chain component.

CORN PRODUCTS REFINING COMPANY  
ARGO, ILLINOIS

THOMAS JOHN SCHOCH  
CARL B. WILLIAMS

RECEIVED JUNE 12, 1944

(4) T. C. Taylor and J. M. Nelson, *ibid.*, 42, 1726 (1920); T. C. Taylor and H. A. Iddles, *Ind. Eng. Chem.*, 18, 713 (1926).

## NEW BOOKS

**The Science of Explosives.** An Introduction to their Chemistry, Production, and Analysis. By MARTIN MEYER, Professor and Chairman of the Department of Chemistry, Brooklyn College, and Consulting Chemist. Thomas Y. Crowell Company, 432 Fourth Avenue, New York, N. Y., 1943. xi + 452 pp. 74 figs. 14.4 × 22 cm. Price, \$4.50.

The purpose of this book is to assemble, in one volume, material in the field of explosives "written in a relatively simple and readable style." It is the intent of the author "to emphasize a fundamental and practical viewpoint and to avoid the tendency to make it a text book of synthetic organic chemistry." The scope of the book can be judged by the chapter headings: 1, A General Survey; 2, The Nature of Explosives; 3, Black Powder, Pyrotechnics and Incendiaries; 4, Nitrocellulose and other Nitropolysaccharides; 5, Nitroglycerine and Related Explosives; 6, Elementary Theory of Explosive Action; 7, Grain Size and Shape; 8, The Problem of Nitration; 9, Sulphuric Acid; 10, Nitric Acid, the Fixation of Nitrogen, and Ammonium Nitrate as an Explosive; 11, Smokeless Powder; 12, T.N.T. Nitro Compounds in General and Other Explosives, Including Gases; 13, Chemistry of Initiators; Explosion Flame; 14, Practical Explosive Devices; 15, Practical Initiating Devices; 16, Inspection and Analysis; 17, Application and Use; 18, Packing, Shipping, Storage and Safety.

From the above list, it is obvious that the author has succeeded in his attempt to avoid emphasis on the synthetic aspect of explosives chemistry. The information which is given on methods of manufacture and on specification tests has been taken from the War Department Technical Manual on "Military Explosives" (TM 9-2900) and may, therefore, be considered as authoritative.

The author's objective of simplicity in style has not always been achieved. For example, "An explosive is probably most easily defined, with substantially equal accuracy, as a material which under some circumstances will behave explosively as just stated, as in any other way." Also, "T.N.T. . . . crystallizes excellently well . . ." and "For military purposes, T.N.T. can be used for all types of bursting charges, including armor piercing, although it

is slightly too sensitive for that purpose and has been replaced by ammonium picrate."

It is difficult to decide what previous training is expected of people who use this book. The statement is made "sulphuric acid has the formula  $H_2SO_4$ ," and the use of the chemical balance is described in detail. On the other hand, ammonium nitrate is reported to present five polymorphic forms, and no explanation is given of the meaning or significance of this statement. It would also seem likely that any student able to follow the calculation of the muzzle velocity of a projectile, as given in Chapter 6, would have had some technical training.

Many people in the field of explosives will object to the accuracy of the information presented. The statement that "an outstanding feature of the otherwise colossal American war program is the apparent underestimate of explosive requirements" cannot be excused by the qualification "as indicated by the published figures." It should certainly be realized that published figures might not indicate the total production, and this criticism is an injustice of the Ordnance Department. The truth is that production of explosives has been one bright spot in the war and that at no time have the armed forces had to consider an insufficient supply of explosives in planning their operations. Exception may also be taken to the statement "nothing like the necessary quantity of nitric acid is anywhere in sight in the United States." There will be many who will not agree that TNT should be classified as a detonator, that sensitivity increases with the number of nitro or nitrate groups, that brisant explosives are those with a detonation rate of over 1000 meters per second, or that bomb tests are performed in the field and the chemist has little to do with them. Some organic chemists will not approve of the statements that the nitration of hydrocarbons is a reversible reaction and "nitric acid is characterized by the reaction with organic materials which makes it useful for explosive work and it acquires this property at lower concentrations as the case of nitration increases."

The author has not treated very new developments at length because they "are readily understood by one versed in fundamentals" and because they "will later, prove to be much less startling than their present build-up makes them

appear." Not only are the new developments omitted, but also the principles upon which the more important of the new developments are based.

Less than one page is devoted to the stability of explosives, and the only specific stability tests mentioned are in connection with propellant powders. In a book written from a practical viewpoint, the omission of references to exudation, vacuum stability tests and surveillance practice is noteworthy. Depth bombs which "may contain 1,000 pounds or more of explosive" in which "compressed pyrocellulose . . . may be" the explosive are mentioned and it is noted that "different types of depth bombs are designed for use by ships and airplanes against submarines"; this is the entire treatment of underwater explosives and explosions.

Many statements in the book are confusing. It would seem that students might be bewildered by the statement that bombs "range in size from 200 to 4000 pounds, perhaps even more," while in the next paragraph it is stated that bombs may "range in size up to 8000 pounds or more." The same objection might be made to presenting insensitivity as an advantage of TNT and sensitivity as a disadvantage of the same material. Both student and teacher may find difficulty in interpreting the statement that the addition of softer substances will lower the sensitivity of nitroglycerin. From the standpoint of people engaged in work with explosives, this book contains many items of reference which will be useful, although the omissions will be regretted. People inexperienced in the science of explosives will be presented with a fair picture of the broad aspects of the field, although they may be confused by certain inconsistencies. The book is well printed with very few typographical errors and has an attractive red cover.

RALPH CONNOR

**Organic Reactions.** Volume II. ROGER ADAMS, *Editor-in-Chief*, WERNER E. BACHMANN, LOUIS F. FIESER, JOHN R. JOHNSON and H. R. SNYDER. John Wiley and Sons, Inc., 440 Fourth Avenue, New York, N. Y., 1944. v + 461 pp. 15.5 × 23.5 cm. Price, \$4.50.

The unusually cordial reception by organic chemists of the first volume of this series will undoubtedly be repeated with the present volume. A general account of the series, separate volumes of which will appear periodically, was given in *THIS JOURNAL*, **64**, 3062 (1942).

For those not yet familiar with "Organic Reactions," it might be stated that the work is primarily concerned with the scope and limitations of important laboratory reactions. "The subjects are presented from the preparative viewpoint, and particular attention is given to limitations, interfering influences, effects of structure, and the selection of experimental techniques. Each chapter includes several detailed procedures illustrating the significant modifications of the method." The literature coverage is unusually comprehensive.

The ten chapters have been written by highly competent authors who have had uncommon experience with the reactions or processes described: (1) "The Claisen Rearrangement" (D. Stanley Tarbell); (2) "The Preparation of Aliphatic Fluorine Compounds" (Albert L. Henne); (3) "The Cannizzaro Reaction" (T. A. Geissman); (4) "The Formation of Cyclic Ketones by Intramolecular Acylation" (William S. Johnson); (5) "Reduction with Aluminum Alkoxides (The Meerwein-Ponndorf-Verley Reduction)" (A. L. Wilds); (6) "The Preparation of Unsymmetrical Biaryls by the Diazo Reaction and the Nitrosoacetylamine Reaction" (Werner E. Bachmann and Roger A. Hoffman); (7) "Replacement of the Aromatic Primary Amino Group by Hydrogen" (Nathan Kornblum); (8) "Periodic Acid Oxidation" (Ernest L. Jackson); (9) "The Resolution of Alcohols" (A. W. Ingersoll); (10) "The Preparation of Aromatic Arsonic and Arsinic Acids by the Bart, Bechamp, and Rosenmund Reactions" (Cliff S. Hamilton and Jack F. Morgan).

If the same high quality is maintained with future vol-

umes in the series, and there is no reasonable doubt on this point, then the invaluable work is assured a place in the classical literature of organic chemistry.

HENRY GILMAN

**Magnetochemistry.** By PIERCE W. SELWOOD, Associate Professor of Chemistry, Northwestern University, Evanston, Illinois. Interscience Publishers, Inc., 215 Fourth Ave., New York, N. Y., 1943. ix + 287 pp. 80 figs. 15.5 × 23.5 cm. Price, \$5.00.

As the theory of magnetism has been developed to its present stage there has arisen the need for books which emphasize not so much the fundamental theory itself but rather its utilization for problems of structural chemistry. Whereas such books as van Vleck's, "Theory of Electric and Magnetic Susceptibilities" (1932) and Stoner's "Magnetism and Matter" (1934) deal essentially with the theory of magnetism, a few books were published which served more as a guide for what may be called "Magnetochemistry," such as "Physical Principles and Applications of Magnetochemistry," by Bhatnagar and Mathur (1935), "Magnetochemistry" by Klemm, and some chapters in Pauling's "Nature of the Chemical Bond" (1939). Since then the application of magnetic measurements to chemical problems has grown to an enormous extent. The number of publications since 1934 is estimated by the author of this book to be more than a thousand. This very fact is a full justification for this book. The material is presented in the following chapters: "Measurement of Magnetic Susceptibility," "Atomic Diamagnetism," "Molecular Diamagnetism," "Atomic Paramagnetism," "Molecular Paramagnetism," "Complex Compounds," "Metallic Dia- and Paramagnetism," "Ferromagnetism," and "Applied Magnetochemical Analysis." The book reveals in concise but rather extensive fashion and with good criticism both the actual progress and the still innumerable gaps in the field. The bibliography of more recent publications appears to be complete. The presentation of the fundamental theory of magnetism is adequate to a book concerned mainly with its application. This monograph is highly recommendable not only for specialists in the field but also for chemists in general.

L. MICHAELIS

## BOOKS RECEIVED

May 10, 1944–June 10, 1944

- CHARLES A. BROWNE. "A Source Book of Agricultural Chemistry." (No. 1 of Volume 8 of *Chronica Botanica*, edited by Dr. Frans Verdoorn.) Waltham, Mass., the Chronica Botanica Co.; New York, G. E. Stechert and Co. 290 pp. \$5.00.
- C. DRUCKER, Editor. *Ostwald-Luther "Hand- und Hilfsbuch zur Ausführung physiko-chemischer Messungen."* Most Recent, Fifth Revised Edition. Dover Publications, 31 East 27th Street, New York 16, N. Y. 986 pp. \$4.95.
- MORRIS B. JACOBS. "The Analytical Chemistry of Industrial Poisons, Hazards and Solvents." Second, revised reprint. Interscience Publishers, Inc., 215 Fourth Avenue, New York, N. Y. 661 pp. \$7.00.
- J. R. MORTON, D. R. CLIPPINGER and L. P. EBLIN. Under the Editorship of Herman T. Briscoe. "A Laboratory Program for General Chemistry." Houghton Mifflin Company, 2 Park Street, Boston, Mass. 272 pp. \$2.00.
- E. B. SANDELL. "Colorimetric Determination of Traces of Metals." Interscience Publishers, Inc., 215 Fourth Avenue, New York, N. Y. 487 pp. \$7.00.
- DON M. YOST and HORACE RUSSELL, JR. "Systematic Inorganic Chemistry." Prentice-Hall, Inc., 70 Fifth Avenue, New York, N. Y. 423 pp. \$6.00.