

NEW BOOKS

ORGANIC CHEMISTRY. Vol. III and Vol. IV.

HENRY GILMAN, editor-in-chief. Vol. III, xxxviii + 580 pp.; vol. IV, xxxviii + 665 pp. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 1953. \$8.75. Reviewed by F. A. GUNTHER, University of California Citrus Experiment Station, Riverside, Calif.

The original and revised editions of Vol. I and Vol. II of this series comprising an advanced treatise on organic chemistry are well known to organic chemists and to many others who have been exposed to graduate-level courses in organic chemistry. Despite their inclusive title, these four volumes do not pretend to cover all of organic chemistry, but rather consist of specialized chapters of detailed treatments of particular topics or branches of organic chemistry considered by the editors and other chemists to be of real significance to workers in many fields of chemistry. Consequently, much of the material in these four volumes is useful to chemists and others interested in problems of food and agricultural chemistry.

Thus, the two new volumes, of six chapters each, may prove to contain information useful and pertinent to such interests. Briefly, the twelve new chapters consist of the following: Study of Organic Reaction Mechanisms, by P. D. Bartlett; Applications of Infrared and Ultraviolet Spectra to Organic Chemistry, by F. A. Miller; Lipids, by J. C. Cowan and H. E. Carter; Organic Dyes, by H. W. Grimmel; Some Aspects of Chemotherapy, by H. R. Ing; Antibiotics, by L. C. Cheney; The Terpenes, by R. H. Eastman and C. R. Noller; Heterocyclic Chemistry, by R. C. Wiley; Starch, by W. Z. Hassid; Chemistry of Explosives, by G. F. Wright; Reactions of Organic Gases Under Pressure, by W. E. Hanford and D. E. Sargent; and Oxidation Processes, by W. A. Waters.

Of particular interest to many chemists and others concerned with food and agriculture will be the chapters on infrared and ultraviolet spectra, on lipids, on antibiotics, on the terpenes, on heterocyclic chemistry, on starch, and on oxidation processes. Those workers interested in mechanisms and modes of action of biologically active compounds will find Bartlett's chapter on organic reaction mechanisms to be profitable reading for the realistic approach to plausible reaction chemistry; they will also find much to think about in Ing's

chapter on chemotherapy. Because of the depths of interests in biological chemistry, many experienced workers will find the chapters on lipids, antibiotics, heterocyclic chemistry, and starch to be too brief, especially since more comprehensive books or sets of books on these topics have recently been published elsewhere.

Miller's chapter on infrared and ultraviolet spectra will prove to be widely consulted by food and agricultural chemists, particularly those interested in fresh and aged residues of pesticides in agricultural products. Spectrophotometric methods of identification and of quantitative analysis are enjoying increasing popularity with analysts. Miller has presented a general survey of the applications of spectrophotometric methods to organic chemistry not only to provide acquaintance with these important techniques but also to enable judgments as to when and how they may be of use in solving a particular problem. In 53 pages, Miller describes and compares these two types of spectra for both qualitative and quantitative applications. The reproduction of Colthup's well-known chart of characteristic infrared group frequencies (Fig. 4) and the inclusion of an 8-page table of the characteristic infrared absorption bands (Table I) should be extremely useful in quantitative analyses for groups of atoms, as in explorations of pesticide degradations *in situ*. To illustrate and quoting from Miller, if "a sample possesses a band at 1650 cm.^{-1} , Fig. 4 suggests that it may be due to (among other things) a C=C bond. Reference

to Table I then shows what other bands may be characteristic of this linkage. The finding of these other bands gives increased support to the assignment and may also provide more details about the structure. In the case cited, for example, the rearrangement of the substituents around the double bond may be indicated. If no such supporting evidence is found, there must be some reservation about concluding that a C=C bond is present and the possibility of other structures suggested by Fig. 4 must be considered."

In another table (Table II), Miller also lists the characteristic ultraviolet absorption of 35 different chromophores as similarly useful generalizations for electronic spectra.

The analyst concerned with "contaminants" in food and other agricultural products should have recourse to both infrared and ultraviolet facilities, and this chapter will be an invaluable aid to such applications.

Glycerol. ACS Monograph No. 117

CARL S. MINER and N. N. DALTON, Editors. XIV + 460 pages. Reinhold Publishing Corp., 330 W. 42nd St., New York 36, N. Y. 1953. \$12.00. Reviewed by N. L. GIANAKOS, Shell Chemical Corporation, New York, N. Y.

The ACS monographs are intended to serve two principal purposes: provide a thorough treatment of a selected area in a form usable by persons working in



Isn't that your "broad spectrum" insecticide, Morley?

unrelated fields and stimulate further research in the specific field treated—implemented by extensive references to the literature.

That these purposes have been achieved in the present monograph is a tribute to the familiarity of the editors and collaborators with the broad subject of glycerol; an impression of the broad area of interest in glycerol is gained from the facts that there are over 1500 commercial uses (as compiled by the Glycerine Producers Association), some 3,000 concerns report information on stocks, production, and consumption monthly to the Bureau of Census, and there are over 200 producers in the U. S. The editors and most of the collaborators have been associated with glycerine for the past 25 years.

The introductory chapter of the book deals briefly with history and economics. Glycerine's background has been explosive, colorful, and controversial. A more thorough discussion of the economics is therefore justified, especially those factors which produced glycerine's peculiar past economic history.

Three chapters by Truman Godfrey, long associated with glycerine, deal with natural sources, methods of production, and methods of recovery and refining. More emphasis is given to each of the latter two chapters than to

any other chapter in the book. Considerable details, adequately illustrated with flow sheets, are given on current methods of production and refining ex-fats. The Shell Chemical Company's process for synthesis from propylene is described. Past attempts to produce glycerine via fermentation and hydrolysis of carbohydrates are discussed, and a brief evaluation of the economics is given for each. This part of the book is fairly complete and is adequately done.

Two chapters by J. B. Segur cover the subjects of glycerine standards and specifications and analysis. All recognized standards and specifications are given. Also included is the ambiguous term C.P. which as A. M. Patterson recently discussed in his "Words about Words" section of *Chemical and Engineering News* is considered obsolete by many manufacturers.

The section on analysis gives details of qualitative and quantitative methods for glycerine in almost every stage of occurrence and production. Included is the periodate oxidation method for assay recently adopted by the AOAC.

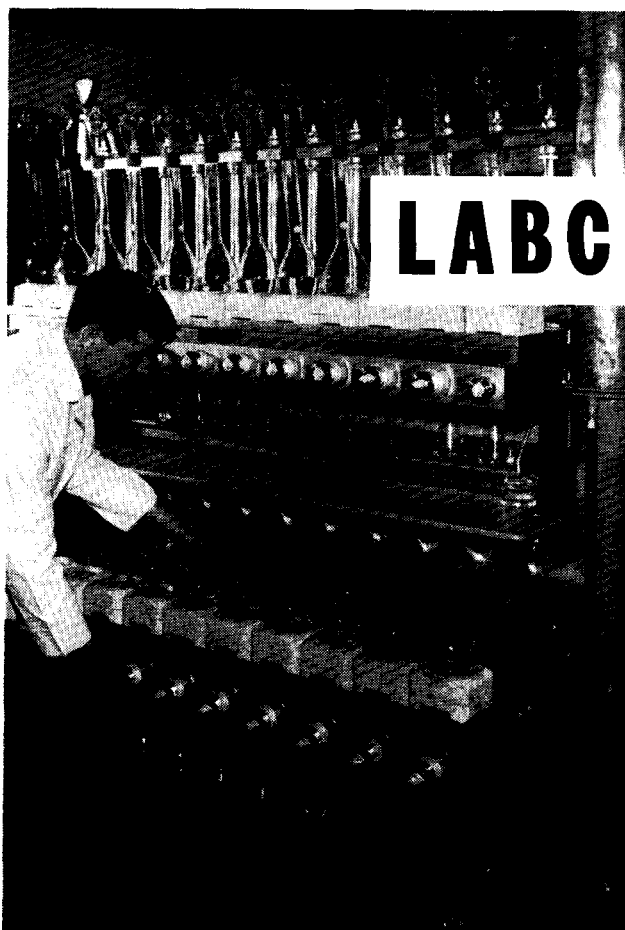
The chapter on physical properties of glycerol and its solutions alone is worth the price of the book, especially to those engaged in research involving glycerine and its applications. This

section is complete in all respects. Glycerine's long history has provided sufficient time for the evaluation of its physical properties. However, considerable effort was required to centralize all this information, as 191 literature references attest.

The following three chapters deal with glycerol's chemical properties, biochemical use, and physiological action.

Some 25 pages in the last chapter concern the uses of glycerine. This chapter does not do justice to the versatility of glycerine in its many applications and should have been written in as much detail as was done with the chapters on production and refining. Specifically, it would be helpful to know the point of entry of glycerine in the manufacturing process of the end products, the pertinent details of the process, and the ultimate fate of the glycerine in the end product. To a degree, this type of information for certain end uses may not be obtainable or is difficult to obtain from manufacturers. However, it is hoped that subsequent revisions will contain much more information on the uses of glycerine.

There is no doubt that this volume is the most complete authoritative source on glycerol available today. It would be useful to not only the scientist, but also to the executive, the student, and the purchasing man.



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