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Book Reviews†

Synthetic Methods of Organic Chemistry. Volume 28. By W. Theilheimer. Yearbook 1974. S. Karger, Basel and New York. xx + 652 pp. 16 × 23 cm.

There can hardly be anyone with modern graduate training in synthetic organic chemistry who has not browsed at one time or another through the library set of "Synthetic Methods of Organic Chemistry," the continuing series masterfully edited by William Theilheimer.

This 28th volume lives up to the scholarly tradition of its predecessors. The method of classification of chemical transformations is explained thoroughly in the preface and need not be discussed here. There is the usual cumulative subject index, in this instance for Volumes 26–28. Several specialized indexes based on the now famous Theilheimer notation system are included, and there is also a useful short review entitled "Trends in Synthetic Organic Chemistry–1974" which deserves to be singled out.

In all honesty this Reviewer is troubled by a disquieting impression that many chemists, especially perhaps medicinal chemists, still view this reference source with a mixture of awe and puzzlement. A typical remark might be "I know it's there, but I don't use it much." The reasons are probably several: the multilingual format, a ponderous system of organization and symbology, and occasional annoying lapses in coverage ("I couldn't find my beautiful paper cited!"); all these things may cause some to glance through the book once and, shrugging their shoulders, return it to the shelf forevermore.

Needless to say, the initiated Theilheimer *afficionado* knows better. He knows, for example, that he may find the specific reagent or chemical reaction he is looking for, or again that he may not—*it almost doesn't matter!* What he can be certain to find is an astonishing harvest of chemical knowledge more varied than he could ever imagine. And if even a tiny fraction of this knowledge finds a lasting place in his personal bag of synthetic tricks, the effort will have been amply justified.

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Reagents for Organic Synthesis. Volume 4. By Mary Fieser and Louis F. Fieser. Wiley-Interscience, New York, N.Y. 1974. 660 pp. 15.5 × 22.5 cm. $24.95.

This fourth volume in the series covers the 1970–1972 synthetic organic literature. The format used previously is repeated with the reagents indexed not only as to subject but also as to reactions and compound type. Volume references are also given for those reagents appearing in Volumes 1–3. Almost 300 new reagents are reviewed for the first time, which indicates the rapid rate at which new reagents are being introduced. A significant deletion in this volume is that this is the first of the many books published by the Fiesers that does not include a picture of a cat. This series continues to be a most valuable reference source for synthetic organic chemists.

†Unsigned book reviews are by the editorial staff.

Biosynthesis and Enzymic Hydrolysis of Penicillins and Cephalosporins. By E. P. Abraham. University of Tokyo Press, Tokyo, Japan. 1974. 86 pp. $7.00.

The two essays included in this volume summarize Professor Abraham's presentations of the E. R. Squibb lectures at the Waksman Institute of Microbiology (Rutgers University) in 1973. He focuses on the following in his review of the biosynthesis: amino acid precursors; intracellular peptides; roles of peptides P1, P2, and P3; biosynthetic studies with *Cephalosporium* and *Penicillium* protoplasts; mechanisms of ring closure; roles of 6-aminopenicillanic acid and isopenicillin I; and control mechanisms. The following aspects of β-lactamases are mentioned: significance of enzymic hydrolysis in chemotherapy; evolution and induction of β-lactamases; properties relating to active sites; and approaches to clinical problems arising from the production of β-lactamases. Although few experimental details are included in the essays, 88 and 138 references are cited for the first and second topics, respectively, and some relate to work published in 1974.

The major value of these essays lies in Professor Abraham's clear presentation of the problems under study (frequently with high priority in his own laboratory), the strategy involved, and the value of the results obtained. His 35 years of experience in penicillin and related research programs provides a unique perspective not usually available in most research programs. The uninitiated will find these essays the best available summary of the current status of these two problems; the expert will be stimulated to reevaluate his current programs studying one or more aspects of penicillins and cephalosporins.

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Receptors for Reproductive Hormones. Edited by B. W. O'Malley and A. R. Means. Plenum Press, New York, N.Y. xii + 458 pp. 17 × 25 cm. $25.00.

This book is volume 36 in a series entitled "Advances in Experimental Medicine and Biology," and it consists of the proceedings of the Conference on Receptors for Reproductive Hormones held on July 10–11, 1972, at Vanderbilt University, Nashville, Tenn. The conference was supported by the Center for Population Research, National Institutes for Child Health and Human Development. Twenty papers were presented at the conference by many of the leading researchers in the rapidly developing area of sex steroid and gonadotropin receptors.

The 20 papers can be divided into five main parts. The first seven chapters deal with estrogen receptors in general, with four of them dealing particularly with the nuclear events relating to the mechanism of action. The current concept of the estrogen–receptor complex is covered in the first chapter, discussing the model of one estrogen binding site per uterine receptor, a physical change of the cytosol complex to its nuclear state, and the features of the model still to be proven or modified. The second chapter is concerned with the influence of endogenous estrogen on the translocation of the estrogen–receptor complex to its nuclear locus and a proposed two-phase uterotrophic action of estrogen. Estrogen–receptor transformation is dealt with in the third paper, supporting the hypothesis that the important step is receptor transforma-

tion and the steroid hormone functions to induce this transformation. The next two chapters cover the interaction of the estrogen receptor with DNA, suggesting that constituents of chromatin other than DNA are involved in the specific estrogen–receptor attachment to the target nuclei. Estrogen–receptor variations between rat and human and the estrogen's receptors in both rat and human mammary carcinoma are the topics of chapter 6 and 7, respectively. The later chapter also discusses a guide to endocrine therapy of human metastatic breast cancer.

The eighth chapter provides a continuity between the first part, estrogen receptors, and the second part, androgen receptors. This chapter discusses studies on androgen and estrogen uptake in the rat hypothalamus and the effect on the estrogen receptor of androgen administration to neonatal female rats. Also discussed are the androgen receptors of the hypothalamus involved in this androgenization and their differences from the "classical" 5α-dihydrotestosterone receptor. Two other papers on androgen receptors evaluate the current status on the binding and the mechanism of action of androgens in the sexual and prostate glands; the failure to find these particular androgen receptors in other androgen-sensitive cells is also discussed.

The third part of the book covers other aspects of sex steroid hormone–receptor interactions. One paper concerns the progesterone receptor, its purification, and its resolution into two components having different binding activities in the nucleus. Another paper discusses the relationship of estradiol to adenylyl cyclase and the resulting role of cyclic AMP in the uterus. A third paper in this miscellaneous part deals with affinity-labeling steroids, their use in the characterization of the steroid binding sites, and their particular application to 20β-hydroxy steroid dehydrogenase.

The theory and mathematics of hormone–receptor interactions are covered in the fourth part of the book. Basic principles of bimolecular interactions and models of cooperative binding are reviewed. The "quantal" model, which regards the cell as the unit for response, is also discussed. The effects of the kinetics of these cooperative binding systems on radioimmunoassays are also presented here.

The final section of the book covers research in gonadotropin receptors. The first paper discusses the use of autoradiographic analysis of gonadotropin binding, involving the application of radioiodinated protein hormones to frozen rat ovarian sections. High-affinity binding sites at tissue and cellular levels are described using this approach. The other three papers in this section deal with the specific interactions of gonadotropins with the rat testes and rat ovaries. All of these papers discuss the binding of the particular hormone to a membrane-bound receptor, the relationship of this binding to an activation of membrane-bound adenylyl cyclase, and a subsequent intracellular protein kinase activation. Attempts to solubilize and characterize the membrane-bound receptors are also discussed in these papers.

The papers presented in this book cover the current research efforts of the investigators and each paper reflects the individual style of the author. Most of the chapters consist of a brief introduction, a short description of materials and methods, a presentation of data and results, an in-depth discussion and conclusion, and an excellent summary of the paper at the end. Other chapters are a more general overview of the research and a discussion of the conclusions emanating from the research work. Every paper also contains an extensive list of references. However, the book does not contain any question–answer discussions that might have resulted following the presentations of the papers. Such discussions can add pertinent information to the work presented or shed light on unsolved problems. Also, the book lacks an author index and contains an inadequate subject index. Nevertheless, this book is an excellent collection of the present research efforts of the leading international investigators in the field of reproductive hormone receptors and is an example of the rapid advancement and the level of progress in the elucidations of the mechanisms of action of sex hormones. Valuable research techniques are presented in this book, and thus it is recommended for pharmacologists, biochemists, medicinal chemists, and many other investigators involved in the study of the mechanism of action of reproductive hormones.

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Essential Aspects of Mass Spectrometry. By Alberto Frigerio. Spectrum Publications, Inc., Flushing, N.Y. 1974. 121 pp. 16 × 24 cm. $7.95.

During the past 10–15 years mass spectrometry has rapidly developed into an analytical technique applicable in a variety of disciplines. In the biomedical area in particular mass spectrometry is generally recognized as essential for the research program of most laboratories. In many instances, because of the rapid expansion of the field, a good many workers in the biomedical or other disciplines are unfamiliar with the principles and potential of the method. The purpose of this book is to close the communication gap between mass spectrometrists and scientists of other disciplines, by providing the latter with a basic, yet comprehensive, description of the fundamentals of mass spectrometry, its applications and analytical capabilities. The presentation is indeed basic if not elementary and should be easy to follow for those totally unfamiliar with the field. The subjects touched upon include basic instrumentation and discussion of common types of mass spectrometers, the principles of fragmentation of organic ions, isotopic abundance calculations, and a short introduction to GC–MS and mass fragmentography. While the elementary level of presentation accomplishes, in part, the author's objective to reach the "layman", his attempt for oversimplification of the subject has resulted in the omission of certain important issues. It is surprising, for example, that no discussion has been included about molecular separators for GC–MS. The average reader is quite familiar with the high-pressure operation of a gas chromatograph; yet, he is told of on-line GC–MS coupling while early in the book it is explicitly stated that high vacuum is a requirement for the operation of a standard mass spectrometer. A number of misprints have also come to the attention of this reader (see, e.g., pp 35 and 85) while the expressions "even ion" and "odd fragment ion" (p 71) presumably refer to ions of even and odd mass, respectively. These should not be confused with "odd" and "even-electron ions" discussed earlier.

In general, the layman will find this book useful for familiarization with the basic concepts of mass spectrometry, but it is doubtful whether such an elementary presentation can stimulate further interdisciplinary research. If a scientist is in any way serious about learning the field of mass spectrometry and its potential utility to his discipline, he is strongly urged to consult other references. Some of these are included in the book's bibliography and even though they have also been written for people with little or no previous knowledge of mass spectrometry, their in-depth treatment of the subject can better serve the general scientific interests.

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Regulation of Porphyrin and Heme Biosynthesis. Edited by Manfred Doss. S. Karger, Basel. 1974. 508 pp. 24.5 × 17.5 cm. $52.00.

This volume records the "Proceedings of the International Research Conference on Regulation of Porphyrin and Heme Biosynthesis" held at Marburg a.d. Lahn, June 28–July 1, 1973. Control mechanisms of porphyrin biosynthesis are the main topic but organic synthesis, structural analysis, and diagnostic metabolite profiles in derangements of hepatic porphyrin metabolism are also considered. There were sessions on biochemical microbiology, enzymes, experimental porphyria, regulation of hepatic δ-aminolevulinic acid synthetase, pathological biochemistry, clinical biochemistry, organo and biosynthesis, and relation between heme and globin synthesis. A useful report on the discussion of each session prepared by the session moderator is included. The moderators were A. Neuberger, G. Kikuchi, T. Tephly, G. Marks, L. Israels, R. Levere, S. Joubert, A. Jackson, and P. Koskelo. A total of 64 papers was presented. Abstracts of the conference have been published in *Hoppe-Seyler's Z. Physiol. Chem.*, **354**, 839–866 (1973). This book is a worthy contribution to the detailed literature of the field.

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