The editors, who themselves have contributed several chapters, have managed to keep the style and presentation uniform, lucid, and easy to read. One may look forward with pleasure to the next two volumes of this work. The book may be recommended to medicinal chemists, experimental biologists, and physicians who have to study and treat infectious diseases.

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Enzyme and Metabolic Inhibitors. Vol. 1. General Principles of Inhibition. By J. LEYDEN WEBB. Academic Press, New York, N. Y., 1963. xxi + 949 pp. $26.00.

Most enzymes possess more inhibitors than substrates. In addition, enzyme-inhibitor interaction constants are always also equilibrium constants while an enzyme-substrate interaction constant may or may not be an equilibrium constant. For this reason enzyme-inhibitor constants, though more difficult to evaluate precisely, are more immediately comparable than enzyme-substrate constants. The large volume under review here is the first in a projected set of four primarily concerned with inhibitors and inhibition. While the three succeeding volumes will deal with specific inhibitors, this first volume develops in considerable detail general principles of inhibition. The contents might best be indicated by listing the titles of the 17 chapters: 1, Perspectives of Metabolic Inhibition; 2, The Kinetics of Enzyme Reactions; 3, The Kinetics of Enzyme Inhibition; 4, Substrate Inhibition and Product Inhibition; 5, Determination of the Mechanisms and Constants of Inhibition; 6, Interactions of Inhibitors with Enzymes; 7, Inhibition in Multienzyme Systems; 8, Distribution and Fate of Inhibitors in Living Organisms; 9, Inhibition in Cells and Tissues; 10, Effects of More Than One Inhibitor; 11, Localization of the Site of Inhibition; 12, Rates of Inhibition; 13, Reversal of Inhibition; 14, Effects of pH on Enzyme Inhibition; 15, Effects of Various Factors on Inhibition; 16, Specificity of Inhibition; and 17, Suggestions for Planning and Reporting Inhibition Studies.

As indicated by the chapter titles, the book is concerned with broad areas of inhibition, from interactions between parts of molecules to aspects of inhibition in whole organisms. Chapter 6 on molecular interactions contains a valuable discussion of the forces between molecules. It is unfortunate, however, that the author did not include a more thorough discussion of hydrophobic interactions. No reference is made to the article by W. Kauzmann, *Advan. Protein Chem.*, **14**, 33 (1959), one source where hydrophobic bonds are discussed. Their importance seems underestimated in this book. The free energy change for the transfer of a methyl group from an aqueous to a hydrocarbon environment [*J. Am. Chem. Soc.*, **84**, 4240 (1962)] is about equal to the deficiency of dispersion forces in accounting for the binding of a single substrate methyl group to cholinesterase as discussed on p. 286. A second point inadequately discussed appears in Chapter 14 where the bell-shaped plots obtained when reaction rate is plotted against pH are interpreted almost entirely in terms of ionizing groups. Yet either ascending or descending portions of a bell-shaped plot may not be due to a simple ionization constant but to an ionization constant modified by ratios of other equilibrium and rate constants [see for example, *J. Am. Chem. Soc.*, **81**, 4552 (1959)] or simply to ratios of rate constants alone as demonstrated in a simple nonenzymatic system [*J. Am Chem. Soc.*, **81**, 5089 (1959)]. Thus the last sentence on p. 655 is not true. No discussion of the general principles of metal ion inhibition is presented but perhaps this subject will appear when specific metal ion inhibitors are considered in a later volume. Now that it has been established that substrates alter the conformation of at least some enzymes it will be of interest to see to what extent various inhibitors act in the same fashion.

In any book of general principles with such breadth, considerable selection is required in choosing examples to illustrate the principles. Though this section is admittedly largely subjective, some of the examples seem to have been chosen without sufficient discrimination. For instance, the citing on p. 196 of the thiol ester grouping as the reactive form of the sulfhydryl group in the enzyme papain ignores the fact that the proposer of this grouping at the active center has never accounted for his own extensive kinetic data in these terms and indeed it does not seem possible to do so. On p. 809 in a discussion of the possible general effects of dielectric constant changes on α-chymotrypsin hydrolysis in methanol solutions, no reference is made to the specific effect of low concentrations of methanol [*J. Am. Chem. Soc.*, **82**, 3336 (1962)].

These comments should be taken less as criticisms than as indications of the book's scope and thought-provoking qualities. Even the first volume of the projected four represents an enormous labor. This first volume is not a reference work but often contains incisive discussions of points concerning inhibition. As such it should be in personal libraries where workers may become familiar with its contents and be able to refer to it frequently and conveniently. Unfortunately, the high price reveals that the publishers are planning only upon the assured sale to libraries, on whose shelves the valuable volume is apt to remain little used.

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Spectrometric Identification of Organic Compounds. By ROBERT N. SILVERSTEIN and G. CLAYTON BASSLER. John Wiley and Sons, Inc., New York and London, 1963. viii + 177 pp. $8.50.

Recent years have witnessed the explosive development and use of instrumental techniques as aids for the elucidation of structures of organic compounds. These developments have been largely paralleled by the appearance of erudite monographs which have helped the organic chemist apply such methods to his own research. This dependence on instrumentation has now reached such proportions that a course in the subject is definitely indicated and an increasing number of institutions are, in fact, incorporating such material in their formal study programs. Generally, such ventures have been largely limited by the lack of an adequate book, written for the beginner, which describes how information obtained from different instrumental methods can be used in complementary fashion to greatest advantage.

The book by Silverstein and Bassler is a step in this direction. It is an outgrowth of a course given by the authors at San Jose State College in the spring of 1962, consisting of eleven lecture hours and four hours of discussion. The object of the book is to acquaint the reader with four instrumental techniques important to the organic chemist, these being mass, infrared, nuclear magnetic resonance, and ultraviolet spectrometry; it emphasizes the value of combining information obtained from them in the solving of structural problems.

The book consists of eight chapters, the first of which is a one and one-half page introduction explaining the purpose of the book and the scheme followed in the remaining chapters. Each of the next four chapters is devoted to one of the techniques indicated above, and contains a brief discussion of the theory, instrumentation, sample preparation, and interpretation of spectra. An excellent list of references in each case includes most of the more extensive reference works in that particular field.

The discussions of these techniques are usually clear and concise, and the chapters contain numerous diagrams, charts, tables, and extensive appendices (many borrowed from other sources) which help the reader to correlate and use the information presented. In some instances, this reviewer had the opinion that the material presented is almost too concise. In the infrared chapter, for example, combination and overtone bands are mentioned in the discussion of possible pitfalls in interpreting infrared spectra, but where one might suspect their presence in a spectrum is not indicated. Another potential source of trouble here, Fermi resonance, is not mentioned at all. As another case in point, in the section on theory, it may have been helpful for the beginner if diagrammatic representations of the vibrational modes of the AX_3 group, as well as the AX_2 group, had been included. However, these shortcomings are relatively minor and do not detract appreciably from the value of the book. A particular point on the bright side is the presentation of all infrared data in both μ and cm.$^{-1}$ units, which makes the discussion easy to follow regardless of the system the reader is familiar with.

Since the book is written for the organic chemist, it is not surprising to find that the authors stress interpretation of spectra to a greater extent than the theoretical aspects of energy absorption. The theory is, however, usually treated in sufficient detail so as to provide an adequate understanding of the general principles involved.

The chapter on nuclear magnetic resonance is well presented and deals almost exclusively with proton magnetic resonance.

The data are given in both δ and τ units, and the chemical shift and simple spin–spin coupling phenomena are clearly explained. Useful tables of proton chemical shifts are also included. Because of the current rapid developments in this field, an instructor using the book in a course may want to supplement the material with some of the newer developments. Some cases in point might include the questionable validity of the theory of Karplus concerning interdependence of coupling constants with bond angles, the use of metal ions as aids in interpreting spectra, carbon-13 studies of carbon containing no hydrogen atoms, etc.

The chapter on mass spectrometry discusses the fragmentation patterns of different types of structures and explains how a mass spectrum can be used to deduce structural information and an empirical formula. Again, the rapidly developing field here places it in somewhat the same category as nuclear magnetic resonance. This technique should enjoy increasing interest among organic chemists as more mass spectrometers become available.

The ultraviolet absorption chapter contains a discussion of the different types of electronic transitions which can occur and explains B, E, K, and R bands. Unfortunately, the Woodward rules for calculating ultraviolet spectra are rather vaguely presented and some newer references as to their extensions and applications are not cited (*e.g.*, Fieser and Fieser, "Steroids," 1959, p. 15 ff; Fieser and Fieser, "Advanced Organic Chemistry," 1961, p. 201 ff.).

The information given on the four types of spectrometry is put to practical use in Chapters 6, 7, and 8, which contain sets of practice spectra on which the reader can test his interpretative skills. Chapter 6 contains the four types of spectral information for each of twenty compounds of increasing complexity, and the reasoning behind the systematic solution of each structure is clearly explained by the authors. Chapter 7 contains the spectral information for ten compounds, each with a Beilstein reference, so that the structures arrived at by the reader can be checked. Chapter 8 consists of ten additional compounds for which no structural references are given.

The book is written in large, readable type and has few typographical errors. The large pages (22.5 × 29.5 cm.) allow convenient reproductions of spectra and wide tables without having to turn the book sideways to read them. Practicing organic chemists with a weak background in the potentialities of the instrumental techniques discussed will find the book particularly helpful. Because of its rather elementary style, it should also find wide acceptance among graduate students and as a supplemental test in such courses as qualitative organic analysis.

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Keeping up with Pharmacology. Two new books. **Recent Advances in Pharmacology.** J. M. ROBSON and R. S. STACEY, Ed., University of London. Little, Brown & Co., Boston, Mass., 1962. x + 406 pp., 68 illustrations. **Annual Reviews of Pharmacology,** Vol. 3, W. C. CUTTING, Ed., Annual Reviews, Inc., Palo Alto, Calif. vi + 486 pp. $8.50.

"Recent Advances," although labeled 3rd edition, is essentially a new book covering the highlights of pharmacological research of recent years. The 3rd volume of "Annual Reviews" covers essentially, in more detail, the events of the last year or so. Both books are remarkably up-to-date; it is not easy to discuss the latest papers if one has to meet an absolute deadline, and if the content of one's book is to present the newest thoughts and experiments. This is particularly true for the "Annual Reviews" series, and the haste of publication may serve as an excuse for the somewhat shallow proof-reading noticed in many chapters. The British book is almost free of typographical errors.

"Recent Advances" is addressed both to the professional pharmacologist and to chemists and biologists who want to survey current trends. Each subject is given the proper historic perspective which permits the reader to re-live the development of the field, the fumbling among alternative explanations, the decisive observation, the clearer understanding of a phenomenon, or the application of a useful procedure or drug. The recent preoccupation with central nervous system (CNS) events and drugs is reflected in the first four chapters which discuss pharmacologically active substances in the CNS, psychotropic drugs (somewhat sketchy), catecholamines, and 5-HTA. The remaining nine chapters touch upon the following subjects: pharmacologically active polypeptides, antidiabetic agents, newer steroids as well as anticholesterolemic drugs, antihypertensives and diuretics, chemotherapeutics for bacterial and for tropical infections, and an assortment of newer pharmacodynamic drugs. The underlying theory of each condition and therapeutic attempt is discussed clearly, and even though not every opinion is presented at every turn, the prevailing thoughts are beautifully arranged for interesting reading and thorough understanding. The book should be useful to medicinal and biochemists, pharmacologists, and physicians alike.

The "Annual Reviews" volume is introduced by a nostalgic review of his own work by H. H. Dale, and concluded by the annual review of reviews by Chauncey D. Leake. Between these poles are 17 chapters covering reactions and inhibition of enzymes, the metabolic fate of drugs of recent interest, drugs active on the CNS, on lipid metabolism, on autonomic events, on the neuromuscular junction, and on cellular reactions in cancer. Even though almost all of the authors have been chosen because of their known ability to write good reviews, the task assigned to some of them has proved to be too much when a firm scientific basis for the respective discussion is not yet at hand. Drugs for the protection against ionizing radiation and the effects of drugs on behavior are examples of topics which cannot yet be discussed conclusively. There are several chapters on toxicology and pharmacological techniques, and these and the others reflect the high standards one has come to expect of the "Annual Reviews" series.

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Progress in Medicinal Chemistry. Vol. 2. G. P. ELLIS AND G. B. WEST, Editors. Butterworths, Inc., London, 1962. ix + 201 pp. $11.25.

The complexity and the rapid progress in many areas of medicinal science make it increasingly difficult for an individual investigator to keep up with all developments even in a limited field. Perspective in such interdisciplinary subjects is gained best by broad reviews written by experts or teams of experts. The second volume in the present series offers an admirable attempt to cover four timely topics both in depth and in historical completeness. A. H. Beckett and A. F. Casy discuss their favorite subject, analgetic drugs; W. C. Bowman writes on mechanisms of neuromuscular blockade; and J. D. P. Graham surveys 2-halogenoalkylamines and other enimonium formers. These three topics are at a temporary plateau of activity and can be reviewed with some detachment. The fourth chapter by G. E Davies, on anaphylactic reactions, treats a subject whose biochemical causes are still shrouded in mystery; obviously, it cannot be discussed on the same molecular level as other fields which are, or are believed to be, better understood. However, both the chapters on anaphylaxis and neuromuscular blockade are presented lucidly in the light of present knowledge and are suggestive of the next steps of research in these areas.

All these reviews will be of great interest to medicinal chemists and pharmacologists. A new circle of readers will, however, also want to use this volume. An excellent chapter on the patenting of drugs by F. Murphy will be interesting to lawyers and administrators in addition to medicinal scientists. Although written by a British patent attorney, the U. S. procedures are well set forth. Inventions, specifications, claims, and all other portions of a patent application are explained, many aspects of licensing are detailed, and procedures to secure overseas patents are listed. As in the purely scientific chapters of this book, this chapter lays the groundwork for further reading but will serve as an excellent brief introduction to patenting.

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