

## Book Reviews

**Clinical Chemistry.** Edited by R. Richterich and J. P. Colombo. Wiley, Chichester, New York, Brisbane, and Toronto. 1981. xxiv + 766 pp. 16 × 23 cm. \$94.50.

This is an updated revision, in English, of a textbook that has been published previously in several German editions. The translation is flawless and the reader is unaware that it wasn't written originally in English. The analytical aspect of clinical chemistry is emphasized with its application to metabolic and organ function evaluations. The book is divided into four sections and an appendix.

Basic organizational and operational considerations of a clinical chemistry laboratory for efficient internal operation and effective external communication are discussed in the first section. The first part of this section includes a description of the science of clinical chemistry, its responsibility for reliable methodology, its functional components, and its need for data processing to meet the demands of ever increasing numbers of specimens and methods. The remaining parts of the first section include definitions and description of measurement units, statistics, normal values, quality control (with a system for monitoring blank, standard, and control values), laboratory physical facilities, solution preparations, and correct specimen collection procedures.

The second section of the book concerns separation and quantitative analytical techniques. Correct procedures for weight and volume measurement are in the first part of this section. The separation techniques of centrifugation, filtration, dialysis, electrophoresis, and chromatography are all described in this section. The basic principles of the analytical techniques of optical, electrochemical, and isotopic quantitation are given in this section, along with their automated adaptations. The electrochemical detection description mentions use of immobilized enzymes in electrodes, but the application of immobilized enzymes in automation with optical detection is not mentioned. Descriptive material on dry multilayered film applications is also missing from the part on automation.

Metabolic investigations is the topic of the third section with the inclusion of enzyme determinations, water, electrolytes, osmolality, acid-base regulation, blood oxygen, trace elements, energy metabolism, carbohydrates, nitrogen metabolism, lipid metabolism, enzyme metabolism, and a final brief part on pharmacology and toxicology. The material on enzyme determinations includes the analytical aspects of enzyme activity quantitation as well as use of enzymes for substrate quantitation and markers in immunoassay. The second part on enzymes, like the ones on other metabolic systems, reviews the physiology of these systems and relates pertinent analyses to differentiation of malfunction. The pharmacology and toxicology part of this section is brief and covers quantitation of *p*-aminobenzene derivatives, salicylate, phenacetin, and barbiturate.

Organ specific determinations for diagnosis and monitoring of bone, cardiac and skeletal muscle, the hematopoietic system, gastrointestinal tract, pancreas and salivary glands, liver, endocrine glands, nervous system, male genital organs, and kidneys are included in the fourth section of the book with a brief description of the physiological function of each organ.

The Appendix section of the book consists of explanatory information for the previous sections, such as tables for preparation of buffer solutions, transmission/extinction readings, and conversion factors for SI units; nomograms for body surface area,  $pCO_2$ , and acid-base status; as well as examples of quality control charts. A valuable inclusion in this section is a listing of drugs interfering positively and negatively with clinical chemical determinations.

In summary, this is a text with current, in-depth coverage of the analytical techniques of clinical chemistry. The physiological considerations are less in-depth and serve as a review of previous study. The book is a valuable teaching and reference text. However, the expensive price of the book makes it less of a

consideration for a required text.

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**General and Synthetic Methods. Volume 4. Specialist Periodical Reports.** By G. Pattenden, Senior Reporter. The Royal Society of Chemistry, Burlington House, London. 1981. xii + 376 pp. 13.5 × 21.5 cm. \$118.25.

This report, similar in scope and format to the previous volumes in this series, covers the literature published during 1979. The subject matter is classified according to chapters entitled "Saturated and Unsaturated Acyclic Hydrocarbons", "Aldehydes and Ketones", "Carboxylic Acids and Derivatives", "Alcohols, Halogeno-compounds, and Ethers", "Amines, Nitriles, and Other Nitrogen-containing Functional Groups", "Organometallics in Synthesis", "Saturated Carbocyclic Ring Synthesis", "Saturated Heterocyclic Ring Synthesis", and "Strategy and Design in Synthesis". There is an additional section on "Reviews on General Synthetic Methods" which also includes a few entries from 1978.

The chapter on "Photochemistry in Synthesis", included in previous volumes, has been deleted and such citations are now integrated throughout the text. In accordance with increasing interest in the subject, the enlarged chapter on Organometallics is divided into two parts which deal with "Transition Elements" and "Main Group Elements", respectively. With this notable exception, the remainder of the text is concerned with synthesis of the various functional derivatives and does not lend itself readily for reviews of reactions of such derivatives. A survey of any particular functionality requires a page by page perusal of the entire volume.

Some chapter titles are misleading; for example, "Hydrocarbons" does not deal with hydrocarbons per se but rather with formations and transformations of the hydrocarbon components of functionalized derivatives.

There is an author index and a detailed table of contents, but, of necessity, no subject index. Since the classification system used results in overlaps and duplications, cross-references would be helpful. However, due to the use of different reporters for authoring each chapter, there are very few such cross references.

This volume is an invaluable aid to synthetic chemists who are hard pressed to keep up with the ever expanding literature in their field. Unfortunately, the even more rapid expansion of the price of these volumes, 40% in this case compared with the previous volume, will not only preclude most individual ownership of these highly desirable reports but has already led even libraries to become more selective in their acquisitions.

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**Recent Developments in Mass Spectrometry in Biochemistry and Medicine. Volume 6.** Edited by Alberto Frigerio and Malcolm McCamish. Elsevier Scientific Publishing Co., Amsterdam, Oxford, and New York. 1980. ix + 553 pp. \$83.00.

The International Symposium on Mass Spectrometry in Biochemistry and Medicine is now an established scientific event which attracts the participation of most prominent scientific groups in this field. It has been customary to publish the proceedings of the meeting in an expensive but, nonetheless, well-produced book form. The present edition is no exception. There are 52 scientific articles, classified in six general categories: (1) "Endogenous Compounds; Qualitative Studies". (2) "Endogenous

Compounds; Quantitative Studies". (3) "Exogenous Compounds; Qualitative Studies". (4) "Exogenous Compounds; Quantitative Studies". (5) "Instrumentation and Methodology". (6) "Environmental Studies". As may be expected from the nature of the topics considered, the boundaries are not sharply defined, but the classification is a useful guide. The biochemist/user of mass spectrometry will find a wealth of information concentrated under one cover rather than searching for it if scattered through the literature. In that respect the savings in time and added convenience compensate for the high price of the book. The whole issue should be noted for its good quality. The print is well reproduced and the clarity of the figures excellent. In all, the interested reader will find this a useful publication and a valuable edition to one's reference library.

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**Heterocyclic Compounds. Volume 38. Isoquinolines. Part 1.** Edited by Guenther Grethe. Wiley, New York. 1981. xviii + 561 pp. 16 × 24 cm. \$125.00.

We have here the first part of a contemplated four-part series on the various facets of the chemistry of the isoquinolines. The present part is itself divided into four chapters.

In the first chapter, Professors Dyke and Kinsman present a well-written description of the properties and reactions of simple isoquinolines and their hydrogenated derivatives. The judgments of the authors are judicious and well founded. When they state that a certain transformation is unusual, it is indeed unusual, while if they write "presumably", there is certainly an element of doubt in the data presented. In this same vein, the alternate mechanism offered by the authors on page 57 is superior to that given in the original literature. Professors Dyke and Kinsman have looked up a very large number of references, and have collated the material into a meaningful whole.

Professors Kametani and Fukumoto have discussed synthetic and natural sources of the isoquinoline nucleus in Chapter 2 and have written in the process a thorough and most valuable review on synthetic methods for obtaining isoquinolines. This is definitely no rehash of material that has appeared in slightly different form in other reviews. They have culled from the literature several little known but relevant transformations which they have successfully integrated in their presentation. In a very few instances, however, a somewhat more cautious attitude toward the literature would have been warranted. Two such examples come to mind. In the discussion on page 179 to explain the formation of tetrahydroisoquinolines by the reaction of *N*-benzalphenethylamines with acyl halides in the presence of aluminum trichloride, it is unlikely that an  $\alpha$ -chloro-*N*-acyl intermediate is actually formed as depicted. Secondly, on pages 260–261, the mechanism for the conversion of benzazepine 444 into benzyloisoquinoline 447 most probably involves the intermediacy of an aziridinium cation.

The biosynthesis of isoquinoline alkaloids has been knowledgeably discussed in the third chapter. The author, Professor McDonald, has limited himself to data actually supported by experiments with labeled precursors. His coverage ranges from the simple isoquinolines to the more complex isoquinoline alkaloids and terminates with a presentation of the data presently available for morphine and the phenethylisoquinolines. In a few cases, the explanations given are not completely clear to the reader; witness the discussion on the stereospecificity in the aromatization of norrecticuline to give papaverine given on page 296. This is due mainly, however, to the limitation imposed on the author(s) in the use of too great a number of structural formulas. Since most organic chemistry is stereochemistry, an adequate number of structures is always required, in spite of the costs involved. Interestingly, the references quoted by Professor McDonald come

up to 1978, while in some other chapters references stop with the year 1976.

The last and fourth chapter is by Professor Bradsher and deals with the synthesis and reactions of quaternary isoquinolinium salts. Here again, a large body of data dispersed in the literature has been brought rationally together. An interesting and worthwhile feature of this chapter is the discussion on the medical, agricultural, and industrial applications of isoquinolinium salts.

Overall, the six authors and the editor should be congratulated for producing a work of considerable scope, admirably executed. They have done a conscientiously illuminating job. This book is a requirement in any chemical research library.

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**The Heterocyclic Chemistry of Phosphorus: Systems Based on the Phosphorus–Carbon Bond.** By Louis D. Quin. Wiley, New York. 1981. ix + 434 pp. 16 × 24 cm. ISBN 0-471-06461-0. \$47.50.

Along with progress on the fundamental understanding of the reactivity of phosphorus compounds, new methods have been found for incorporation of phosphorus into heterocyclic ring systems. This volume summarizes syntheses, spectroscopy, and special properties of heterocyclic compounds in which there is at least one carbon–phosphorus bond. Although this field has seen world-wide explosive growth in the last 2 decades, it seems likely that there is much more to come and that the methods described in this book will be extremely useful not only for those interested in synthesis and in phosphorus but also for those interested in finding new pharmaceuticals. A carbon–phosphorus bond can serve as an isosteric analogue for oxygen–phosphorus bonds in biochemically important phosphates, thereby providing the basis for synthesis of interesting physiologically active agents as Engel has demonstrated (*Chem. Rev.*, 1977, 77, 349). In addition, because tetracoordinate phosphorus(V) is tetrahedral, it can serve as an isosteric analogue of carbon. With this latter principle in mind, the research possibilities clearly become infinite.

The great virtue of this monograph by Quin is the tables of information. Many monographs and reviews are of limited utility because they reduce the literature to inadequate generalizations. After an introductory chapter, Quin covers the synthesis of five-membered, six-membered, and other rings in Chapters 2–4. These chapters both review the published methods of syntheses and include useful tables, such as Table 2-5 in which additions to the double bond of phospholenes are displayed, along with such useful comments as "H<sub>2</sub> approach is exclusively from the P=O face".

Chapters 5, 6, and 7 cover <sup>31</sup>P, <sup>13</sup>C, and <sup>1</sup>H NMR spectroscopy, respectively. These chapters include compilations of data not readily found elsewhere. For example, there are 30 pages of tables of <sup>31</sup>P NMR spectral data at the end of Chapter 5.

The final chapter, Chapter 8, "Special Properties of Phosphorus Heterocycles", includes sections on molecular structure, conformational properties, influence of ring size on reaction at phosphorus, and electron delocalization. It might have been good to have included some additional material on general principles of reaction of these compounds, but the chapters on synthesis do contain considerable information on modification and reactions of these ring systems.

This appears to be an essential book for the organophosphorus chemist and should be a useful addition for most libraries because it includes so much data which are not compiled anywhere else.

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