

BOOK REVIEWS

Practice of Thin Layer Chromatography. J. C. TOUCHSTONE and M. F. DOBBINS, University of Pennsylvania, School of Medicine. Wiley-Interscience, New York, N. Y. 1978. xxiii+383 pp. 16 x 23.5 cm. \$21.50.

This is essentially a cookbook with emphasis on commercial products. One of the chief attractions of thin-layer chromatography (TLC) is that it is relatively inexpensive, but this book is geared to conspicuous consumption. It contains extensive lists of products and manufacturers and photographs of commercial equipment. Oddly, Stahl's spreader, which more than any other device made TLC practical, is missing from among the ten photographs showing the spreading operation. Also missing is any mention of Peifer's important contribution to the preparation of thin-layer plates. In their cookbook directions, the authors often go to ridiculous extremes in explaining the obvious, e.g., that the amount of adsorbent for 20 x 40 cm plates is twice as much as for 20 x 20 cm plates (Table 2.3), but when it comes to explaining the underlying principles of TLC, they manage to obfuscate the simplest concepts. A few quotations from this book will illustrate my point:

"Adsorbent=Substance that absorbs others, usually on the basis of wetting ability" (p. xv).

"Continuous development =Development occurring over a distance that is usually greater than one plate length" (p. xvii).

"Deactivation=The process of making the chromatographic layer less active to decrease its separation capabilities" (p. xvii).

"Ion exchange=In chromatography, it usually refers to symptoms where the stationary phase is made of an ionic polymer . . ." (p. xix).

"Solvent front=The forwardmost point of the mobile phase during development" (p. xxi).

"The furthestmost edge of the application is called the starting point or origin" (p. 6).

"Paper chromatography also enjoys this advantage but has the disadvantage that the times involved in achieving a separation are among the longest found in any form of chromatography" (p. 12).

"Sephadex . . . The mechanism of separation is primarily one of partition governed by steric hindrance" (p. 36).

"Silicic acid plates are prepared in much the same way as silica gel plates, but they contain a greater amount of silica in the form of polysilicic acid" (p. 51).

"Many polar compounds are difficult to chromatograph because of their poor solubility and high polarity" (p. 79).

"A polar solvent is one of high ion potential. Conversely, a nonpolar solvent is one with very low ion potential" (p. 79).

"Solvents in mixed mobile phases may interact, if solvents are not pure or vary in composition from batch to batch, the nature of the mixture will vary even if its preparation is similar from day to day" (p. 102).

"Intramolecular forces . . . These forces are physical and they are characterized by low equilibrium and result in good chromatographic separation" (p. 103).

"Benches that have sun on them during part of the day should be avoided because of temperature variation" (p. 141).

"Be careful that the paper is not so high that it prevents proper seating of the lid on the tank" (p. 142).

"Multiple Development . . . As the mobile phase encounters a substance with a low R_f , it will begin to move it along the layer until it reaches another substance with a greater R_f value and begins to move it. As the mobile phase continues to migrate along the layer, this process is repeated a number of times, and the travel length of the substance with the lower R_f keeps increasing until the mobile phase reaches the substance with the higher R_f value . . ." (p. 144).

"Reversed-Phase Partition Development . . . When the plate is to be impregnated with a stationary phase containing more than 60% water, it is suggested that the plate be dried at 120° before the chromatography. This makes the plate more resistant to water. Prolonged heating should be avoided, to prevent driving the silane groups off the layer" (p. 154).

"Overmigration of sample zones with resultant high R_f values and inadequate separation often results when the operator does not remove the plate from the chamber after a given development distance" (p. 158).

". . . paper is more uniform than thin layers and the spots may be more discrete" (p. 238).

Books written by more than one author often show differences in style, but there is no need for two authors to write a book in which the difference is so extreme that the left hand does not know what the right hand is doing. Thus, I read on p. 13 that "densitometric methodology is beyond the scope of this book; those interested should consult the recent literature on the subject," whereas Chapter 9 devotes 15 pages to this subject.

Reviewers often say that a certain book "belongs on every chemist's bookshelf." I am sorry to say that I cannot recommend this book to anyone, whether he is familiar with TLC or not.

ERICH HEFTMANN, *Western Regional Research Center, Science and Education Administration, U. S. Department of Agriculture, Berkeley, California 94710*

Introduction to High Performance Liquid Chromatography. R. J. HAMILTON and P. A. SEWELL, Halsted Press, John Wiley and Sons, Inc., 605 Third Avenue, New York, N. Y. 10016. 1977. xii+184 pp. 16 x 24 cm. \$20.00.

Liquid chromatography has its origins in natural products research and various forms of this technique continue to be the primary tools for isolating nonvolatile products from natural sources. As most natural products chemists are by now aware, liquid chromatography techniques have improved markedly over the past ten years. It is hard to imagine how the modern natural products laboratory can afford not to have several high performance liquid chromatographs both for analytical and preparative purposes. This technique (so-called HPLC) has matured to the extent that "high performance" has become so routine that several august bodies have recommended that the "HP" be dropped in favor of the less confusing, and less overbearing designation, LC.

Separations of very complex mixtures are now routinely achieved on columns with efficiencies of 20,000-50,000 theoretical plates per meter and many separated compounds can be detected at the 1 ng level (or even 10 pg in favorable cases). The fact that this performance can often be achieved with instrumentation costing considerably less than a modern gas chromatograph lends credence to the idea that training in LC should be a part of the education of every natural products chemist. This new book purports to introduce LC to the applications oriented chemist without the encumbrance of detailed theoretical and experimental detail. A very basic overview is given of the nomenclature, theory, apparatus, and applications.

While I find little of substance or of syntax which is wrong with this book, it does not provide any advantages over the several earlier introductory texts (and the many review articles) on this same subject. The authors have avoided the turgid theory, but have not replaced it with a pedagogically sound approach. They have skipped over many important concepts far too superficially to be of value to the practicing chemist. While a mechanical engineering view of pumps, injectors, and detectors has been thoughtfully avoided, there is not enough meat about apparatus to permit a chemist to intelligently select or utilize the variety of equipment which is now commercially available. The chapters on mobile and stationary phases, preparative techniques, and trace analysis provide an adequate overview for the beginner. They suffer from a lack of detail and no illustrative examples of real separations are provided.

The book is very much weakened by the fact that only a single experimental liquid chromatogram is presented (Figure 1.1) in the entire text. The last chapter is devoted to applications, but only a spattering of references are summarized in tabular form. Many of the cited applications are out of date commercial references which do not involve actual commercial, environmental or biological samples. At best, the reader of this book would receive a superficial overview of modern liquid chromatography presented in a conventional manner. There are far better books on this subject.

PETER T. KISSINGER, *Department of Chemistry, Purdue University, West Lafayette, Indiana 47907*

Atlas of Stereochemistry, 2nd ed., Vol. 1 and 2. W. KLYNE and J. BUCKINGHAM, Westfield College, University of London. Oxford University Press, Inc., 200 Madison Avenue, New York, N. Y. 10016. 1978. xix+236 pp., xi+241 pp., 21.5 x 30.5 cm. \$49.50 each volume.

These two volumes successfully concentrate the up-to-date information on stereochemistry in a clear and organized manner. The emphasis is on absolute configurations of organic compounds, natural products, and some biologically important molecules, which are correlated in the forms of structures and schemes. The processes of configurational determination or correlation are classified into a few categories, e.g. X-ray, Brewster's rule, chemical conversion, etc., accompanied by original references.

As a revision of the first edition, Volume 1 covers the literature up to the end of 1971 in 8 chapters: fundamental chiral compounds, carbohydrates, terpenes, alkaloids, miscellaneous natural products, compounds with chirality due to isotopic substitution, compounds containing chiral axes and planes, and compounds containing chiral atoms other than carbon. Each of these chapters is continued separately in Volume 2 which covers the literature to mid-1976. Such an arrangement allows use of Volume 2 of the second edition in conjunction with the first

edition. Complete author, subject, and formula indices are given at the end of Volume 2. The absolute configurations which were given in the first edition but deleted from, or modified in the second edition are also listed in Volume 2.

In general, these are very good reference books for organic chemists and for biochemists who are interested in stereochemistry. The indices are complete, the classifications and abbreviations are well organized and explained, and the information given is adequate and fully referenced. Compared to other monographs in stereochemistry, the "Atlas" provides little concept and theory but a huge collection of factual information from the literature. The authors have done an excellent job of concentrating and organizing the stereochemical data of approximately 3000 compounds in less than 500 pages. However, the collection is by no means encyclopedic. The compounds containing a single chiral center are probably covered most completely. The natural products are covered selectively and the coverage of compounds with chirality due to isotopic substitution seems rather spotty. This would be an even more valuable document in stereochemistry if each chapter could be extended to a monograph of encyclopedic information in a specific field.

Conformational problems are not encountered in the "Atlas," nor are inorganic compounds covered. The authors have pointed out the significance of stereochemistry in biological processes, but only some very common biochemical molecules are covered. Indeed, the contents of these two volumes are much better represented by the subtitle "Absolute Configurations of Organic Molecules" than the title "Atlas of Stereochemistry." The production of the two volumes is excellent and, as indicated by spot checks, they seem to be remarkably error-free.

MING-DAW TSAI and HEINZ G. FLOSS, *Department of Medicinal Chemistry and Pharmacognosy, Purdue University, West Lafayette, Indiana 47907*

Medicinal Plants of West Africa. EDWARD S. AYENSU, Smithsonian Institution. Reference Publications, Box 344, Algonac, Michigan 48001. 1978. 330 pp. 15.5 x 23.5 cm. \$29.95.

This book is an attempt by the author to stimulate research interest in the medicinal plants of West Africa. To accomplish this, the author has selected from the multitude of plants used medicinally those that are reported to be more commonly used. These are listed by family in a style identical to that found in similar works; each plant is listed by proper name as well as its various colloquial names, and the plant parts and their therapeutic intent are then given. The selection is at once the strength and weakness of the book. On one hand, by listing fewer plants the author does not overpower those new to the field with the immense variety of the West African medicinal flora. On the other hand, the built-in lack of completeness will diminish the books' value in the area of the more experienced investigator. Overall, the book would be most suited for those who are interested in an introduction to the medicinal flora of West Africa. They will find the species and the medicinal use indices most helpful, and can proceed if necessary to the more complete works which are available. Those who are familiar with the area may wish to add the book to their library for the sake of completeness.

JOSEPH E. KNAPP, *School of Pharmacy, University of Pittsburgh, Pittsburgh, Pennsylvania 15261*