Chromatographic Chiral Separations. (Chromatographic Science Series 40.) Edited by Morris Zief and Laura J. Crane. 1987. 432 pp. ISBN 0-8247-7786-7. Price: $99·75 (US and Canada) $119·50.

The vital importance of stereochemistry in terms of molecular function has been appreciated for many years in a wide range of scientific disciplines. Thus, enantiomeric forms of drugs and antibiotics very often have completely different bioactivity, the sensory properties of compounds are influenced markedly by their stereochemistry, and the form of amino acids (D or L) affects their uptake into biological systems. The classical methods of separation of enantiomers based on crystallisation, with or without the prior derivatisation so favoured by chemists at the end of the 19th century, are no longer appropriate for modern needs. The recent advances in chromatographic separation of enantiomers is timely, in that many regulatory bodies are now suggesting that racemic mixtures of drugs are in fact only 50% pure. Of course, it could be argued that such organisations have only considered this move once the means of enforcement, i.e. reliable analytical techniques for chiral compounds, became available.

The book starts with a brief introductory chapter on the history of enantiomeric resolution from the pioneering work of Pasteur. The main sections are then devoted to the three main approaches to chiral separation, namely direct separation, indirect separation and the addition of chiral compounds to the mobile phase. Direct methods involve the use of chiral stationary phases, and there are chapters on the main types used; Pirkle phases, cyclodextrins, vinyl polymers, cellulose derivatives, biopolymers and ligand exchange systems for amino acids.

Pirkle type stationary phases (named after their originator W. H. Pirkle) are probably the most well known in the field and also the most highly developed. The work described in Chapter 3 shows how the earlier empirical approach to stationary phase design has now given way to strategy based on the understanding of 'the elucidation of the chiral recognition processes'. Clearly developments in this area are likely to be far more rapid and sustained once the underlying mechanisms are understood. The other chapters on cyclodextrins (Chapter 5), vinyl polymers (Chapters 7 and 8), cellulose derivatives (chapter 9) and silica α-acid glycoprotein (Chapter 10) also attempt to explain the mechanisms involved, but in these contributions there is a somewhat greater emphasis on the influence of operating parameters at a practical level.

Indirect separations involve the covalent formation of diastereoisomers, as opposed to their transient formation on chiral stationary phases in direct separations, prior to chromatography. The possibilities are obviously

extremely broad and this is illustrated in Table 4·1 in Chapter 4, where a wide range of chiral reagents and their applications are shown.

The third approach to chiral separations requires the addition of chiral reagents to the mobile phase, and this is illustrated for amino acid separations in Chapter 6 and the use of ion-pairing systems in Chapter 11. The final chapter deals briefly with the influence of mobile phases on chiral separations, much of which is standard text book material, or is discussed elsewhere in the book.

There is no doubt that this is a very valuable book for those people entering the field of chiral separations. It is relatively comprehensive and well referenced, and is as up to date as possible. Most of the chapters contain a good deal of practical information. As would be expected from an embryonic science, many of the examples cited are separations of standards, and not real samples. In some chapters there are just too many chromatograms showing the separation of the two enantiomeric forms of a compound. Overall, it is a useful book but at nearly $120 it will be confined to the reference library and wealthy research laboratory.

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