

the kimberlite literature from now on.

Considering that twenty-eight authors have been involved in the writing of this book, the editor has maintained a creditable consistency of style. Criticisms are that there could have been more thorough cross referencing between papers, and there is repetition of data in various tables. These are minor criticisms, however, and do little to detract from the overall merits of the book. The book will appeal more to petrologists than to economic geologists since, although some kimberlites are the host rock of diamond, there are only two small sections concerning diamond. The volume is well produced and the reproduction of most plates (many in colour) is high. The book is very good value and is recommended to anyone interested in kimberlite and upper mantle geology.

J. B. DAWSON

Basis for separation

An Introduction to Separation Science. By Barry L. Karger, Lloyd R. Snyder and Csaba Horvath. Pp. xix+586. (Wiley Interscience: New York and London, November 1973.) £9.75.

SEPARATION science is a relatively new name for an important branch of analytical chemistry and though the name has probably been introduced to brighten the image of analytical chemistry there is no doubt that operations classed as separation are much more scientifically based than most of the other activities to which the word science has recently been attached. Be that as it may, the authors of this book have made a bold and largely successful attempt to treat separation processes from a fundamental point of view, at the same time recognising the great diversity of experimental techniques which can actually be used.

Chromatography is undoubtedly the most versatile, sensitive and most widespread separation technique in use today but it is arguable whether roughly half this book should have been devoted to chromatography leaving the same space to cover all other important techniques: extraction, distillation, crystallisation, membrane separation, electrophoresis, particle fractionation and mass spectrometry. The bias towards chromatography makes this book of particular value to chromatographers as it presents a unified account of this subject within a wider framework, but it may be less valuable to the chemist primarily interested in, say, zone refining or electrophoresis.

Balance aside, the really significant contribution made by the authors is their emphasis that the same basic physico-chemical principles apply to widely differing separation techniques.

These principles are outlined in the first of the three major sections of their book which covers the thermodynamic and molecular basis of distribution equilibria, the kinetics of mass transfer by diffusion and flow, and the operational aspects of the major separation methods. In the chapters of parts 2 and 3 there are repeated back references to part 1 reinforcing this emphasis on fundamentals.

Part 2 deals specifically with techniques based upon phase and distribution equilibria, and here the authors have wisely brought in outside experts to cover distillation, solvent extraction, crystallisation, ion exchange and exclusion processes, they themselves dealing with gas chromatography, liquid-liquid chromatography and liquid-solid adsorption chromatography. In part 3 they cover barrier separation processes, electrophoresis, particle separation and, very briefly, mass spectrometry.

Parts 2 and 3 present a series of reviews of uniformly high quality which contain enough theory for the basis of each technique in fundamental physical chemistry to be clear. Yet the theory does not obtrude and the book is most readable for all of its nearly 600 pages. Each chapter contains a useful bibliography listing full-length texts and the numerous original papers cited in the text.

As a chromatographer, I was particularly impressed by the authoritative and up to date treatment of the different forms of chromatography; in this respect the book is much more than an introduction and presents many new and original ideas.

This book will undoubtedly find an important place in the library of the analytical chemist and particularly in the chromatographer's, and it will provide a stimulus to the teaching of separation science. At 1.7 pence per page it is good value.

J. H. KNOX

Pyrethrum

Pyrethrum: The Natural Insecticide. Edited by John E. Casida. Pp. xvii+329. (Academic: New York and London, December 1973.) \$16; £7.70.

THIRTY years ago, a variety of insecticides of vegetable origin were in use; but virtually all of them except pyrethrum were gradually displaced as modern synthetic insecticides became available. Despite the well publicised adverse effects of these new pesticides, it is likely that they will be needed for some vital uses, for some time to come. But there is no doubt that the present climate of opinion is very favourable for pyrethrum as a non-persistent natural product; hence this book. The virtual restriction to natural pyrethrum

is perhaps unfortunate, in view of the highly promising synthetic pyrethroids recently developed in Britain.

The 17 chapters of the book examine the present knowledge of pyrethrum and its active constituents from various points of view. The first two papers, by industrial experts, trace the commercial history of pyrethrum and the present sources of production. There follow three excellent chapters on chemistry. The composition of pyrethrum extract from the flower heads and methods of analysis and assay are summarised by S.W. Head of the Pyrethrum Marketing Board of Kenya. M. Elliott and N. F. Janes then describe the stereochemistry of the active components. The existence of both geometrical and optical isomers as well as variations in structure make this a highly complex subject, relying in recent years on mass spectrometry and nuclear magnetic resonance, for confirmation of hypothetical configurations. J. Casida then deals with the biochemistry; both the synthesis of pyrethrins in the plant and their degradation pathways in animal tissues.

The next six papers deal with toxicology and pharmacology. These comprise summaries of information on, first, toxicity to mammals, then an excellent paper on the effects of synergists in regard to toxicity by I. Yamamoto, and a rather disappointing account of what is known of the actual mode of action. The three other papers in this section describe original investigations of the effects of pyrethrins on wildlife; some tests of its possible teratogenic, carcinogenic, mutagenic and allergenic action; and interactions with other drugs. In the following section, four chapters describe types of usage: for medical and veterinary pests, for agricultural, and for forestry insects. A chapter on residue and tolerance considerations (including two synergists as well as pyrethrum) is, for some reason, set in the "Summary" section. More appropriately, E. M. Mrak concludes by summarising the advantages and disadvantages of pyrethrum, leaning rather heavily towards the former.

Despite inevitable inequality of treatment, the book provides a good distillation of many complex matters as well as a useful source of references.

J. R. BUSVINE

Corrigendum

IN the book review "IQ and inequality" by Jinks and Eaves (248, 287; 1974), the sentence starting in paragraph 8, line 7 should read "Making *E*, applicable purely to offspring results in a significantly poorer fit to Jencks's data" instead of "...slightly poorer...".