

## Book Reviews

C. David Gutsche: *Calixarenes*, Monographs in Supramolecular Chemistry, Series Editor: J. F. Stoddart, Royal Society of Chemistry, Cambridge, 1989, £39.50 (\$81.00) ISBN: 0-85186-916-5

Dr. Gutsche introduced the term 'calixarene' in 1978 to describe the homologous series of metacyclophanes produced by condensation of formaldehyde with *para*-substituted phenols. The potential for phenolic metacyclophanes to function as synthetic molecular receptors or enzyme mimics was clearly envisaged by Gutsche when he recognised in molecular models the chalicelike or cuplike shape of calix[4]arene, the smallest (tetrameric) member of the series. Twelve years later it is the receptor properties of calixarenes, of which the tetramer, hexamer, and octamer are the most accessible to-date, that are attracting most interest.

In the preface to this elegant and harmonious addition to the chemical literature, Gutsche writes "The area of calixarene chemistry started modestly in the 1970's with a small handful of players. Slowly gaining momentum in the later 1970's, its pace accelerated in the 1980's, and now engages the attention of numerous researchers". That this development has taken place at all is due in no small part to Dr. Gutsche's commitment to unravelling the early, often conflicting literature on the constitution and conformational properties of the products of one-step condensations of *para*-substituted phenols with formaldehyde.

Chapter 1, 'From Resinous Tar to Molecular Baskets', takes the calixarene story from its origins in von Baeyer's phenol-formaldehyde resin, including Baekeland's commercial success with the product, up to the discovery of cyclic structures and the work of Zinke, Cornforth, the Petrolite Company, and Gutsche's own decisive contributions. In parallel studies other workers, notably Hayes and Hunter and Kammerer's group in Mainz developed stepwise syntheses of several calixarenes.

The 'molecular basket' theme is carried through the book with later chapters on synthesis (making the baskets), physical and spectroscopic properties (proving the baskets), conformations of calixarenes (shaping the baskets), reactions and the introduction of functional groups (embroidering the baskets), complex formation with metal and organic cations, anions, and neutral guests (filling the baskets), and finally, calixarenes in action in catalysis, biomimetic, and commercial applications including the patent literature (using the baskets). The latter chapters demonstrate very convincingly that calixarenes are assuming a significant place in supramolecular chemistry along with cryptands, crown ethers, cavitands, and cyclodextrins. This

book is beautifully illustrated. It will appeal to anyone interested in the mosaic of supramolecular chemistry.

M. A. MCKERVEY

S. M. Roberts (ed.): *Molecular Recognition: Chemical and Biochemical Problems*, Royal Society of Chemistry, Cambridge, 1989, £39.50, ISBN 0-85186-796-0

This paperback contains the proceedings of an international symposium held at Exeter University in the Spring of 1989. As Professor Roberts points out in the preface, molecular recognition is a much used expression which means different things to different scientists. Nevertheless, most would agree that regardless of whether the number of recognition points is small or large, molecular recognition is a process involving non-covalent binding and selection of one or more substrate by a given receptor molecule, with possibly a specific function; or as Professor Lehn has put it "recognition is binding with a purpose". Most scientists would also agree that the ideas of molecular recognition have been permeating the classical areas of chemistry more and more in recent years, carrying with them major implications for future developments in bioorganic chemistry, biochemistry, medicinal chemistry, agrochemistry, etc.

That this is indeed so is reflected in the topics in the symposium with contributions on molecular recognition in drug design, dimerisation of vancomycin antibiotics, NMR and crystallographic aspects, the interaction of peptides and proteins including synthetic aspects, host-guest complexation in organic solvents including molecular mechanics calculations, the basis for molecular recognition and stereoelectronic effects, structure-directed synthesis of unnatural products, and the relevance to molecular recognition of the chemistry of surfaces.

In summary, this book is a valuable contribution to a rapidly expanding area of science and offers an excellent resource for both academic and industrial chemists and biochemists.

M. A. MCKERVEY

*Department of Chemistry,  
University College,  
Cork, Ireland.*