

X. Others (Crown, Squarilium, Thiafulvalene). The book possesses four indices (chemical compounds, molecular formulae, absorption maxima and end use of dye).

The authors are to be congratulated on the production of a book which has been carefully compiled and reproduced and which appears to be remarkably free of errors. Its use is clearly explained and is much aided by the presence of the four indices. It should be of use to the general chemist as well as the specialist. Its major drawback, as with so many books, is its price, and more copies are likely to be found in libraries than in personal collections.

Jenny Ames

Alternatives to Animal Use in Research, Testing and Education. Congress of USA, Office of Technology Assessment. Marcel Dekker, 1988. ISBN 0-8247-7977-0. 456 pp. Price: US\$71.50.

This substantial, yet moderately-priced, book presents an entirely balanced and unemotional account of the requirements for and alternatives to animal testing. The objective of the book is to be informative and synoptic about this important subject. It is therefore well-tabulated, has useful and extensive bibliographies at ends of chapters and ends with a useful glossary of terms and general index. One can, for example, look up LD₅₀ for a concise definition in the glossary of terms and then in the general index with the subsection 'alternatives to the LD₅₀'.

The book highlights tissue culture procedures and computer simulations as well as quantitative structure/activity relationships as alternatives for replacing, reducing and refining current experimental methods and discusses how to conduct tests more simply, reliably, economically and humanely.

Whilst it is scientific in its central theme, the book faces ethical questions and draws on federal agencies, animal welfare groups, and others, for expertise and carefully examines recent advances in ten countries other than the USA.

There is now a considerable body of international opinion against the indiscriminate use of animals for experimentation. In particular, the Draize eye test and the LD₅₀ test seem to be needlessly cruel and have focussed a lot of public outrage. The message is clear and some of us are already convinced, whilst others may be open to persuasion. On the other hand we must consider the advantages of medical research and p. 95 of the book, for example, graphically illustrates the pinnacle of success achieved for the coronary by-pass operation, after a multitude of steps (beginning in 1628) involving animal experimentation.

This book presents both the official position and the moral questions at the root of this controversial subject. It concludes that animals *are* morally entitled to be treated humanely but whether they are entitled to more than that is unclear.

I thoroughly recommend this book to all whose work impinges on animal testing and also those who have a general interest in the subject.

Gordon Birch

Zinc in Human Biology. Edited by C. F. Mills. International Life Sciences Institute/Springer-Verlag, London, 1989. ISBN 3-540-7875-8. i + 464 pp. Price: US\$180.00.

Textbooks of biochemistry usually make only brief references to zinc. The reader would not normally learn that Zn^{2+} is the most important Lewis acid in biochemistry, and that over two hundred zinc metalloenzymes are now known in various species. In fact, zinc is an essential micronutrient for all forms of life from microbes to man, and it appears to have a greater variety of biochemical functions—catalytic, regulatory, structural—than any other essential trace element. The breadth of the essential functions of zinc in life processes is indicated by the presence of zinc metalloenzymes in all six categories of the International Nomenclature Classification. Symptoms of zinc deficiency can appear in protean forms, and clinical diagnosis based on either symptomology or analysis of blood and other tissues is extremely difficult in the absence of a high index of suspicion. Nevertheless, there is a growing list of diseases and functional disorders either caused or exacerbated by zinc deficiency, and there is good evidence that the typical British diet provides less than two-thirds of the United States RDA for zinc for normal adults, and less than half of the RDA for pregnant women.

Accordingly, the appearance of this book is very timely. There are twenty-four chapters with contributions by twenty-nine authors. The breadth of coverage is indicated by the following chapter descriptions:

Chapter 1 covers general aspects of the physiology of zinc.

Chapter 2 is an introduction to the biochemistry of zinc by R. J. P. Williams, and provides an excellent over-view of zinc biochemistry.

Chapter 3 details the intestinal absorption of zinc, and emphasises the sometimes neglected role of malabsorption as a factor in zinc deficiency. (Chapter 19 is also relevant here).

Chapter 4 reviews the promoters and antagonists of zinc absorption, and ways in which the availability and biochemical functions of zinc can be influenced by other dietary components.