

The choice of Dr. Brossi as editor of *The Alkaloids* is particularly felicitous since he brings to his position an extensive and impressive background in natural products chemistry as well as pharmacology.

To minimize costs, the publishers have seen fit to let each group of authors draw their own chemical diagrams. This has worked out very satisfactorily, since the structures are well drawn and clearly laid out. The result is that this book of almost 400 pages, with a very large number of tables, charts and structures, is offered for a relatively modest \$49.50. Not a bad deal!

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**Compartmental Models and Their Application.** By KEITH GODFREY. Academic Press Inc., 24-28 Oval Road, London NW1 7Dx, England, 1983. 293 pp. 15.5 × 23.5 Price \$50.00 (£32.00).

The use of compartmental models to describe the disposition of drugs *in vivo* is a widely practiced art in the pharmaceutical sciences. These models very often provide a reasonable phenomenological description of the complex set of events and processes that determine the pharmacokinetics of a drug in mammalian systems. Less often, they also provide a means to interpret or discern what mechanisms are responsible for the observed performance. It is surprising, then, that the current texts on pharmacokinetics do not address the properties and problems associated with the models themselves. Godfrey's text attempts to do just that.

This book provides a comprehensive overview of compartmental models. The subjects can be roughly divided into three general areas (not corresponding to the individual chapters): the performance of linear systems; the problem of identifiability and parameter estimation; and the properties of more complex systems which display nonlinear, time variant, and stochastic behavior. The general layout includes a mathematical description of the various systems, comments concerning their performances, and many examples to illustrate applications. Two cautions must be voiced. First, while proofs have been eliminated, the vocabulary and notation are that of an applied mathematics-engineering approach. This, however, should not be a problem since the author carefully provides good descriptions throughout the text. Second, this is definitely not a pharmacokinetics text. While many of the examples are taken from that area, the emphasis is on the mathematical system and not on the phenomena being modeled. In this respect, the author provides a welcome service to the pharmacokinetics community.

In the first four chapters many linear compartmental systems are presented. The descriptions are straightforward and present an excellent overview. The various models are shown mathematically, their performances are illustrated by numerous calculations and graphical illustrations, and literature examples of actual applications are provided. The third section on nonlinear and time variant systems is similarly well described, to a depth not found elsewhere. The second section on identifiability and parameter estimation is by far the most important contribution of this book. Here, Dr. Godfrey provides an excellent analysis of whether particular models actually can be used to describe real data. Often we decide that a particular model effectively represents a set of data. Is the model unique? In most cases the answer is a resounding no. That fact is amply demonstrated by the use of Laplacian analysis as well as consideration of numerical problems. My only complaint is that the author does not go far enough; the emphasis is on the estimation of microconstants, not on integrated parameter estimation. The problem of correlation between parameters is barely considered; no mention of reparameterization is provided. Yet, this is a minor fault compared with the large assortment of warnings provided.

In summary, this book is an excellent reference document concerning the power and problems of lumped parameter systems composed of first-order differential equations. It is probably the best book on that subject available. The appropriateness of these models is up to us.

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**Formaldehyde: Toxicology—Epidemiology—Mechanisms.** Edited by JOHN J. CLARY, JAMES E. GIBSON, and RICHARD S. WARITZ. Marcel Dekker, 270 Madison Avenue, New York, NY 10016. 1983. 296 pp. 15 × 23 cm. Price \$45.00 (20% higher outside the U.S. and Canada).

The Chemical Industry Institute of Toxicology (CIIT), Research Triangle Park, NC, sponsored conferences on formaldehyde toxicity in November 1980 and, with funding from the Formaldehyde Institute, on November 3, 1982. The papers and discussions of the latter conference are presented in this book.

There are eleven chapters by 26 contributors, of which half are from CIIT. Chapter titles are as follows: "Occupational Exposure to Formaldehyde—Recent NIOSH Involvement," "Mathematical Cancer Risk Assessment for Formaldehyde," "Case Control Study of Cancer Deaths in DuPont Workers with Potential Exposure to Formaldehyde," "Mortality of Ontario Undertakers: A First Report," "Skin Initiation/Promotion Study with Formaldehyde in Sencar Mice," "Skin Initiation/Promotion Study with Formaldehyde in CD-1 Mice," "Mutagenic Effects of Formaldehyde in Bacterial and Human Cells," "Formaldehyde and the Nasal Mucociliary Apparatus," "Reaction of Formaldehyde in the Rat Nasal Mucosa," "The Effect of Formaldehyde Exposure in Cytotoxicity and Cell Proliferation," and "Mechanisms of Formaldehyde Toxicity and Risk Evaluation."

In general these topics are well written, and the summaries of the discussions that follow the actual presentations are of interest. Literature is cited up to the time of publication including 1983 references and citations to manuscripts in press.

In summary of the information presented at this second CIIT conference—it is now well accepted that airborne formaldehyde leads to cancer in rats and mice, that formaldehyde has the potential to cause genetic toxicity, and that formaldehyde will bind to DNA *in vitro*. Clarification, however, is still required regarding the importance of binding *in vitro*, especially as related to detoxification pathways and repair mechanisms. Of prime importance was the need for the results of additional epidemiological studies. While this volume is of restricted interest in the pharmaceutical sciences, it should be of value to those in contact with formaldehyde and its products as well as to toxicologists.

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**Methods in Industrial Microbiology.** By B. SIKYTA. John Wiley & Sons, Inc. One Wiley Drive, Somerset, NJ 08873. 1983. 349 pp. 16 × 24 cm. Price \$79.95.

This short textbook is aimed primarily at the microbiologist who is seeking a very broad and simplified introduction to industrial fermentation processes. The chapter headings: "Introduction," "Culture Equipment," "Sterilization of Media and Air," "Aeration and Mixing," "Substrates for Microbial Processes," "Kinetics of Microbial Processes," "Genetics of Industrial Microorganisms," "Development of Microbial Processes," "Measurement and Control of Microbial Processes," and "Isolation of Microbial Products" indicate that the author has attempted to condense a broad spectrum of biotechnology in a limited space. As a result, the subject matter is treated too superficially to make this a truly valuable reference source (*e.g.*, mass transfer scale-up in two and one-half pages).

The potentially useful aspects of this book might be the listing of the composition of various natural substances (*e.g.* cornsteep liquor) for material balance purposes and, possibly, the reference sources for their historical significance. Otherwise, the book should be of value to the layman interested in a broad view of the fermentation industry.

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