

Pharmacokinetic theory predicts that:

$$F = \frac{\Delta Cl_R}{\text{dose}} \left[ \frac{(AUC)(AUC')}{AUC' - AUC} \right] \quad (\text{Eq. 1})$$

where  $F$  is the fraction of the dose absorbed,  $AUC$  is the area under the plasma concentration-time curve, the prime notation indicates the  $AUC$  in the perturbed renal clearance state, and  $\Delta Cl_R$  is the difference in mean renal clearance between the two experiments (see Ref. 1 for details). Data from a furosemide-probenecid interaction study (4) were used exactly as reported in Table I of that article, and  $AUC$  and  $AUC'$  values for each individual were determined using the relationship  $AUC = \text{dose}/\text{plasma clearance}$ .

The fundamental mechanism used to perturb the renal clearance of furosemide in this interaction study with probenecid seems to be competition for the renal transport system, which actively secretes organic acids (4). In previous studies, it was observed that the improved reabsorption of weak bases from an alkaline tubular fluid was an appropriate perturbation technique (2) and that the reduction in lithium renal clearance caused by chlorothiazide yielded data (3) supporting the validity of Eq. 1. The principal virtues of the data from Ref. 4 are that the two doses were given parenterally (*i.e.*,  $F$  is known to be unity), the physiological status of the volunteers was well

controlled, and the plasma and urine concentrations were confirmed by two independent analytical procedures, thus circumventing the assay difficulties that have hampered some furosemide disposition studies.

When Eq. 1 and the values of  $\Delta Cl_R$ ,  $AUC$ ,  $AUC'$ , and the intravenous dose from Table I of Ref. 4 are used to estimate  $F$ , a value of  $1.05 \pm 0.11$  (mean  $\pm$  SEM) is obtained. This result appears to provide further support for the validity of Eq. 1.

- (1) D. Lalka and H. Feldman, *J. Pharm. Sci.*, **63**, 1812 (1974).
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- (4) J. Honari, A. D. Blair, and R. E. Cutler, *Clin. Pharmacol. Ther.*, **22**, 395 (1977).

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## BOOKS

### REVIEWS

**Microbiology—1977.** Edited by DAVID SCHLESSINGER. American Society for Microbiology, 1913 I St., N.W., Washington, DC 20006. 1977. 593 pp. 17 × 26 cm. Price \$22.00.

The book is divided into seven major and numerous minor sections, covering some of the more important and recent findings in microbiology.

Cell envelope and cell division in bacilli are represented by partial proceedings of the conference on bacilli (other material from the conference appeared in "Microbiology—1976"). Various topics concerning *Pseudomonas aeruginosa* and related components and their recognition by specific lymphocytes or other cell types are discussed. Modes of resistance to various antibiotics by the pseudomonads are covered. Endotoxins, cell wall antigens, and modulation of the immune response are presented in various manuscripts.

A historical review of pyrogen research by Otto Westphal *et al.*, and related articles on endotoxins and other cell wall components of Gram-negative bacteria and their biological activities proved to be very interesting and rewarding.

Viral infections are covered, including mechanisms involved in persistent viral infections, and the possible roles of defective virus in these infections. The roles of DNA in RNA viruses are also discussed. Animal and human models of persistent viral infections and live virus vaccines used in humans are topics also covered. Viruses and plasmids in fungi and protozoa are presented as an enlightening view of this little-known subject. Also in the field of virology is a series of studies of endogenous tumor viruses, including propagation, analysis, and regulation of various tumor viruses.

However, to me the most informative section dealt with novel aspects of penicillin action, including a short history written by Jack L. Strom-

inger of the Department of Biochemistry and Molecular Biology, Harvard University, "How Penicillins Kill Bacteria."

"Microbiology—1977" continues the well-thought out series started in 1974 by David Schlessinger and fulfills the original aim of the series: to remedy part of the problem of keeping up with new developments in the field of microbiology.

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**Fluorescence and Phosphorescence Spectroscopy: Physicochemical Principles and Practice.** By STEPHEN G. SCHULMAN. Pergamon Press, Maxwell House, Fairview Park, Elmsford, NY 10523. 1977. 288 pp. 17 × 14.8 cm. Price \$20.00.

The author states in his preface that this book "is written with the analytical chemist and biological scientist in mind and represents an attempt to make the instrumental, and especially the structural and environmental aspects of luminescence spectra intelligible to the reader with a general college background in chemistry and physics."

Chapter I, entitled "Photophysical Processes in Isolated Molecules," deals with a nonmathematic descriptive treatment of the subject. It serves to describe ideal systems and to define basic terms. Chapter II, "Photophysical Process in Molecules in Solution," surveys the effects of solvent-solute and solute-solute interactions on both the ground and excited states in electronic spectra. Chapter III is a brief description of the practical aspects of the instrumentation employed in the measurement

of fluorescence and phosphorescence. The final chapter is a general description of applications, followed by tables listing literature conditions for the fluorometric and phosphorimetric analyses of selected compounds of biological interest as well as a table summarizing literature fluorometric analyses of inorganic ions.

In the opinion of this reviewer, Chapters I and II best meet the needs of analytical chemists and biologists as described in the preface. They should serve the beginning investigator well and act as a bridge to the more advanced treatments of these subjects. To a lesser extent, this is also true for the chapter on instrumentation. However, this information is also readily available, with at least equal clarity, in the well-established texts on fluorometry as well as from the instrument manufacturers. The chapter on applications is very limited, and even the novice would be better served by using general texts on fluorescence assays.

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**Medical Botany: Plants Affecting Man's Health.** By WALTER H. LEWIS and MEMORY P. F. ELVIN-LEWIS. Wiley, 605 Third Ave., New York, NY 10016. 1977. xii + 515 pp. 17 × 25 cm. Price \$27.50.

Divided into three sections, this book covers injurious, remedial, and psychoactive plants. The authors use an effective style, arranging drugs by therapeutic use with descriptions of various diseases for which there are plant remedies. This style is suitable for a pharmacognosy textbook for beginning students who have not yet been introduced to disease states. The plant drugs are compared with drugs of synthetic origin. There is extensive use of charts and graphs.

The book is blighted by errors, only a sampling of which could be included here. Errors of grammar, spelling, or typesetting should have been prevented by proofreading, e.g., an illustration of a beech tree is listed as *Sorbus aucuparia*. Some errors result from individuals writing on topics outside their expertise, e.g., psyllium seed is listed under "Bulk Purgatives." Psyllium seed may fill up the large intestine so normal stools can be formed but has no purgative action. Some errors result from a lack of recognition of clinical significance, e.g., purslane is included under "Internal Poisons." Although this information appears to be copied from Kingsbury, the evidence is based on a single report of sheep poisoning from Australia. Purslane is one of the safest of the wild edible plants.

Under "Mutagens," a list includes broccoli, brussel sprouts, cabbage, cauliflower, and kale. We are not told whether the other plants listed as mutagens are as safe as these vegetables or that the vegetables are dangerous mutagens. Errors also result from failure to distinguish between folk tales and modern medical practice. An unsuspecting reader may assume that the generous space devoted to garlic and bloodroot indicate that they are efficacious cancer remedies while, in reality, there is little justification for assuming that either is useful.

Errors of fact are also included, e.g., "... methaqualone, a barbiturate addictive depressant . . ." Methaqualone is not a barbiturate, nor does it induce addiction to barbiturates. "Separate in the female, the urethra . . ." Whatever this means, the urethra is not separate in the female. "Symptoms of primary and secondary syphilis can resolve themselves naturally. . . ." These symptoms may go away, but the problem is not resolved. *Cannabis sativa* has only one name listed as a vernacular name, bhang. I have never heard that word used, but I have frequently heard of marijuana, grass, or joints.

Much of the information seems unrelated to the people for whom the book is written, undergraduate students as well as physicians. There are 21 pages of tables of "Chewing sticks for cleaning teeth" and "Plants used to relieve toothache." Few items listed are of significance in world medicine, and only one drug is important in the U.S. Most illustrations are stylized drawings from herbals published centuries ago. They are useful only as illustrations of old herbals.

This book is filled with fascinating information—the authors have undoubtedly done a lot of reading to come up with the amount of accurate information included. The name "Medical Botany" is not appropriate because a large percentage of the space is not occupied with botany and much of it is of little significance to medicine. The errors spoil the book. I can recommend it for professionals who are already knowledgeable about medicine or medical botany but who want historical and anthro-

pological information, are interested in folklore, or who are doing research on plant remedies passed over (in many cases without having been adequately tested) by modern medicine.

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**Clofibrate and Related Analogs. A Comprehensive Review.** Medicinal Research Series, Vol. 7. By DONALD T. WITIAK, HOWARD A. I. NEWMAN, and DENNIS R. FELLER. Dekker, 270 Madison Ave., New York, NY 10016. 1977. 287 pp. 15 × 23 cm. Price \$27.50.

This monograph presents a concise and comprehensive review of the clinical and pharmacological studies of clofibrate and structurally related analogs. As a major prototype drug used in the treatment of hyperlipoproteinemia, a recognized risk factor associated with atherosclerotic lesions in coronary artery disease, clofibrate has captivated the imagination of many scientists working in this field. Sections of the book are devoted to clinical drug trials, clofibrate activity in various animal models of hyperlipidemia, structure-activity relationships of clofibrate-related analogs, proposed mechanisms of hypolipidemic action, drug-induced metabolic effects, and pharmacokinetic studies.

The clinical trials section reviews data concerning the efficacy of clofibrate in lowering serum lipid levels, reducing coronary artery damage, reversing cerebrovascular disease, eruptive xanthomas, hyperinsulinemia, diabetic retinopathy, Type I glycogen storage disease, and the symptoms of gout and diabetes insipidus. The pharmacological section summarizes the effects of clofibrate on the metabolism and distribution of free fatty acids, triglycerides, cholesterol, and lipoproteins, as well as effects on lipoprotein lipase activity and lipolysis in adipose tissue.

Other metabolic effects, not directly associated with the hypolipemic action of clofibrate, are also summarized. These topics include the effects of clofibrate on mitochondrial enzymes, liver peroxisomes, and hepatic enzyme induction. The book integrates the numerous findings from both human patients and experimental animal models and emphasizes the relationship between the hypolipidemic properties of these agents and their usefulness in the treatment of coronary artery disease.

This book also contains a useful Glossary of Selected Terms pertaining to coronary artery disease and its therapy. Containing 774 references, this well-written and comprehensive review is an excellent reference source and guide for clinicians and basic scientists in biochemistry, medicinal chemistry, pharmacology, physiology, and toxicology. It is of particular interest to scientists dedicated to the elucidation of the biological mechanisms of action and design of hypolipidemic agents.

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**Terpenoids and Steroids, Vol. 7. A Specialist Periodical Report.**

Edited by J. R. HANSON *et al.* The Chemical Society, Burlington House, London W1V 0BN, England. 1977. 359 pp. 15 × 22 cm. Price \$50.00. Available from Special Issues Sales, American Chemical Society, 1155 Sixteenth Street, N.W., Washington, DC 20036.

This book is the seventh volume of terpenoids and steroids in a valuable series first published 6 years ago. Hanson has maintained the high standards set by K. H. Overton, editor of earlier volumes. The aim of each series of Specialist Periodical Reports is to provide a systematic comprehensive and critical review of progress in the major areas of chemical research. The various series, which now total 36, are being published annually or biennially on such topics as The Alkaloids; Amino-Acids, Peptides and Proteins; Biosynthesis; Carbohydrate Chemistry; Environmental Chemistry; Foreign Compound Metabolism in Mammals; and Photochemistry.

This volume does not contain a subject index but is organized in a systematic manner which facilitates finding any information being sought. The six pages in the Table of Contents outline this volume in detail. The chapters are divided into many sections, which are identified