Pharmacokinetic theory predicts that:

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

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 ΔCl_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 = dose/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 ΔCl_R, AUC, AUC', and the intravenous dose from Table I of Ref. 4 are used to estimate F, a value of 1.05 ± 0.11 (mean ± SEM) is obtained. This result appears to provide further support for the validity of Eq. 1.

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Received November 14, 1977.
Accepted for publication January 10, 1978.

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. Strominger 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: Physiochemical 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