

Many polar substances of biological interest have limited solubilities in hydrocarbon solvents which lead to experimental difficulties in measuring physico-chemical properties. However, methodology has been, and is being, developed which allows one to make such measurements. The value of having data obtained in an inert solvent justifies the additional effort required. This does not imply that all work should be done in hydrocarbon solutions or that they are always the solvents of choice. In fact, often a more polar solvent is more suitable for a given experimental study. However, one would expect that data obtained in a noninteracting solvent should be more revealing in many situations than data obtained in a more polar solvent where many properties are masked by complex interactions (*e.g.*, hydrogen bonding), and this should be considered in the interpretation of data. Work is being pursued which should allow one to take into account solvent differences in the limit of infinite dilution where solute-solute interactions such as association are negligible.

- (1) T. Higuchi and S. S. Davis, *J. Pharm. Sci.*, **59**, 1376(1970).
- (2) I. M. Klotz, "Chemical Thermodynamics," rev. ed., W. A. Benjamin, New York, N. Y., 1964, pp. 348-358.
- (3) J. Ferguson, *Proc. Roy. Soc., Ser. B*, **127**, 387(1939).
- (4) C. Hansch, *Farmaco, Ed. Sci.*, **23**, 293(1968).
- (5) W. Scholtan, *Arzneim.-Forsch.*, **18**, 505(1968).
- (6) J. A. V. Butler, "Chemical Thermodynamics," 5th ed.,

Macmillan and Co., London, England, 1962, pp. 383-385.

- (7) C. H. Deal, E. L. Derr, and M. N. Papadopoulos, *Ind. Eng. Chem. Fundam.*, **1**, 17(1962).
- (8) S. D. Christian, A. A. Taha, and B. W. Gash, *Quart. Rev.*, **24**, 20(1970).
- (9) A. H. Beckett and A. C. Moffatt, *J. Pharm. Pharmacol., Suppl.*, **21**, 144S(1969).
- (10) M. H. Bickel and H. J. Weder, *ibid.*, **21**, 160(1969).
- (11) M. Nakano, N. I. Nakano, and T. Higuchi, *J. Phys. Chem.*, **71**, 3954(1967).
- (12) A. F. Michaelis and T. Higuchi, *J. Pharm. Sci.*, **58**, 201(1969).
- (13) T. Higuchi, J. H. Richards, S. S. Davis, A. Kamada, J. P. Hou, M. Nakano, N. I. Nakano, and I. H. Pitman, *ibid.*, **58**, 661(1969).

J. HOWARD RYTTING<sup>▲</sup>

STANLEY S. DAVIS\*

TAKERU HIGUCHI

Department of Analytical Pharmaceutical  
Chemistry and Pharmaceutics  
School of Pharmacy  
University of Kansas  
Lawrence, KS 66044

Received April 1, 1971.

Accepted for publication February 16, 1972.

Supported in part by the University of Kansas General Research Fund.

\* Present address: Department of Pharmacy, University of Aston in Birmingham, Birmingham, England.

▲ To whom inquiries should be directed.

## BOOKS

### REVIEWS

**Analytical Metabolic Chemistry of Drugs (Medicinal Research Series, Vol. 4).** By JEAN L. HIRTZ. Marcel Dekker, 95 Madison Ave., New York, NY 10016, 1971. xvii + 395 pp. 15.5 × 23.5 cm. Price \$24.50.

Dr. Hirtz's object in compiling this volume was to provide a source of physical and chemical techniques that would enable the analyst to "separate, purify, identify and determine" drugs and their metabolites in biological media. It would thus seem to have been aimed primarily at laboratories involved in some way in drug metabolism studies. A fine line was drawn by excluding from consideration those methods concerned only with studies of "absorption, distribution, blood levels, *etc.*" Citing 1044 references, some 350 drugs and their metabolites are covered.

The book is divided into twenty chapters, all but two classing drugs by chemical structure. The two exceptions are the chapters on antibiotics and on miscellaneous drugs. Most will find the grouping convenient. The style is reportorial, a detailed accounting, in almost cookbook fashion in many instances, of the methods by means of which drug metabolites were separated from their congeners in biological fluids and purified for the purpose of identification and quantitation.

One would hope the author to have been less modest and allowed the spice of his own experience to flavor the book in critical ap-

praisal of the material he presents. The most serious criticism, however, is one suffered in common by all authors of technical books and is offered here as a stimulus to Dr. Hirtz to speed the updating, now in progress, of the present volume. The latest reference date was 1966 and the intervening six years have seen no slacking off of drug metabolism studies nor end to improvements in analytical methodology. For example, his report on chlorpromazine, though exhaustive, would benefit by reference to the more recent studies by Holmstedt and by Curry.

Inclusion of gas chromatographic techniques employing the recently introduced nitrogen detector, and of isolation techniques employing the newer XAD resins, would have made the book of more immediate practical value. The author may also have inadvertently slighted the women's lib movement by omitting any reference to synthetic steroids. Despite these shortcomings, the book would make, as the author suggests, a suitable companion piece to R. T. Williams' classic *Drug Detoxications*.

The foreword was written by Prof. E. R. Garrett who apparently had a role in bringing the book to this country from France and in "Americanizing" the translation which reads smoothly, with but few lapses in spelling, grammar, or syntax.

Reviewed by S. S. Walkenstein  
Smith Kline and French Laboratories  
Philadelphia, PA 19101 ■