expected value. (If the analysis is restricted to hydrocarbons that melt at or below 150, the observed slopes are 13.96 for Eq. 2 and 15.40 for Eq. 3.)

Thus, it appears that Eq. 2 is more meaningful than Eq. 3 for quantitating the effects of solute crystallinity on solubility. This finding implies that the value of ΔC_p for the polycyclic aromatic hydrocarbons is closer to zero than it is to ΔS_f. These results are in agreement with the results obtained for the aqueous solubility of a large number of organic nonelectrolytes of widely varying structure (1).

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BOOKS

REVIEWS

Analytical Profiles of Drug Substances, Vol. 9. Edited by KLAUS FLOREY. Academic, 111 Fifth Ave., New York, NY 10003. 1980. 618 pp. 15 × 23 cm.

This book is the ninth in a continuing series that covers the analytical aspects of specific drug entities. It was compiled under the auspices of the Pharmaceutical Analysis and Control Section of the Academy of Pharmaceutical Sciences. The individual profiles or monographs are much more complete than those found in the compendia. The information in the *Analytical Profiles* series not only includes compendial tests but also important supplemental information including synthesis, additional physical properties, data on stability, absorption, metabolism, and excretion, and various analytical methods. In general, each profile is a literature review, but IR, mass spectrometric, UV, and NMR spectra are reproduced along with appropriate crystallographic data. The coverage of the quantitative analytical procedures is usually very complete and includes dosage forms, biological fluids, foodstuffs where appropriate, and related information.

Volume 9 includes 19 new monographs: bacitracin, bretylium tosylate, carbamazepine, cefaclor, cefamandole nafate, cyproheptadine, dibenzepine hydrochloride, digoxin, doxorubicin, fluphenazine decanoate, gentamicin sulfate, haloperidol, khellin, lorazepam, methoxsalen, nadolol, nitrazepam, nitroglycerin, and trifluoperazine hydrochloride. In addition, the *Addendum* contains monographs for griseofulvin and methadone hydrochloride.

While praising *Analytical Profiles* in general, and Volume 9 in particular, this reviewer believes it is time for the editorial board to define more carefully what they want *Analytical Profiles* to become. Some of the drugs covered in Volume 9 are relatively new entities. Others, such as bacitracin, digoxin, haloperidol, khellin, and nitroglycerin, could be called classics. One would have thought that these drugs would have been covered years ago. It is not clear from reading the two monographs on griseofulvin and methadone hydrochloride in the *Addendum* what has been added. Furthermore, a review of the bibliography for griseofulvin shows 18 of 29 references published prior to 1969, six prior to 1974, four prior to 1979, and one unpublished paper authored by the individuals who wrote the monograph. Griseofulvin also appeared in Volume 8 of *Analytical Profiles*. What new information appears that was not published a year ago? This question is not answered. The other drug published in the *Addendum*, methadone hydrochloride, first appeared in Volumes 3 and 4 and probably is in need of updating. But, again, the updated information is not specified. Indeed, this monograph does not even reference the previous material found in Volumes 3 and 4.

The two drugs covered in the *Addendum* brings up another point. There does not seem to be a systematic plan to update the older monographs. With the rapid changes occurring in analytical methodology and instrumentation, such a plan seems to be imperative.

Nevertheless, this series meets a real need by bringing together a concise literature review of the analytical description of important drug entities. Volume 9 is no exception. Its purchase is recommended highly for appropriate libraries, workers in pharmaceutical analysis, and teachers of pharmaceutical chemistry who want to maintain excellent personal libraries.

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Clinical Pharmacokinetics: Concepts and Applications. By MALCOLM ROWLAND and THOMAS N. TOZER. Lea & Febiger, 600 Washington Square, Philadelphia, PA 19106. 1980. 331 pp. 17 × 25 cm. Price U.S. $29.50 (Canada $35.50).

This book is an important contribution that will facilitate teaching a clinically relevant introductory course in pharmacokinetics. The goal of the authors was to fill a void which, in their own words, "has been the lack of a book that teaches the application of pharmacokinetics in drug therapy" to students, practitioners, and researchers. They are to be congratulated for achieving their goal.

The book is divided into four sections: Concepts, Disposition and Absorption Kinetics, Therapeutic Regimens, and Individualization. Each section is well supported with literature data and computer simulations. Chapters 5, 6, and 11 present a detailed, yet readable, description of clearance concepts (*i.e.*, the factors that determine steady-state plasma concentration). In contrast to most books written in the area of pharmacokinetics, college calculus is not needed to appreciate the textual material. Indeed, the authors remove much of the "mathematical fog" that has shrouded pharmacokinetics.

Several minor limitations to the text should be listed. Nonlinear kinetics is discussed quite briefly; *i.e.*, after reading the text, it is likely that

a student could not adequately adjust a patient's phenytoin dose. Since the authors have been involved in pioneering work in this field, it may be that such material will be included in an upcoming text to which they allude. However, in this reviewer's opinion, a more detailed treatment of nonlinear kinetics would have been useful.

Another significant defect of this text is that it is difficult to identify the primary source for some textual material. The source of the data contained in the tables and figures is identified. However, it is generally not possible to identify the source of information within the body of the text.

This book is well written and should be considered as a standard text for introductory courses in Pharmacy Baccalaureate and Doctor of Pharmacy programs and for freshman graduate courses in pharmaceutics and pharmacology.

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Second Supplement to USP XX and NF XV. Drug Standards Division, United States Pharmacopeial Convention, 12601 Twinbrook Parkway, Rockville, MD 20852. 245 pp. 20 × 29 cm. Price $8.00.

The *Second Supplement* is cumulative with the first one and contains changes that constitute revisions in the USP XX and NF XV effective May 1, 1981. Additions and deletions in the USP XX official monographs comprise the largest section, totaling 133 pages, whereas those in the General Requirements for Tests and Assays section are contained in 12 pages. Under General Information are selected portions of the regulations promulgated under the Controlled Substances Act and portions of the Poison Packaging Act and Regulations, of interest to students and practitioners in pharmacy and medicine. Changes in the official NF XV monographs comprise almost 20 pages and are followed by an appendix containing excerpts from federal regulations on antibiotics and an index to this supplement.

Staff Review

Solid Pharmaceutics: Mechanical Properties and Rate Phenomena. By JENS THURØ CARSTENSEN. Academic, 111 Fifth Ave., New York, NY 10003. 1980. 259 pp. 15 × 23 cm. Price $35.00.

This brief book, written in terse mathematical style, is an ambitious attempt to consolidate the more important research in the field of solid pharmaceutics. The first chapter contains an introduction to the characteristics of single-component systems, with emphasis on the properties of crystals. Chapter 2 deals with particulate solids and their dimensions and properties. Chapter 3 extends this treatment to two-component systems and includes such topics as blending and the effect of moisture on solids. The next two chapters are devoted to successive stages in the manufacture of tablets: precompression operations, including wet granulation, dry milling, tablet formulation, and lubrication, followed by compression and hardness testing. The book concludes with a section on the physical properties of solid dosage forms, particularly the dissolution of tablets and capsules and their chemical stability.

Solid pharmaceutics is perhaps the area in which the catholicity of the pharmaceutical sciences is most in evidence. In his scholarly treatment of the subject, Carstensen draws heavily on the literature of powder technology, crystallography, chemical engineering, polymer science, and metallurgy. Yet he does not hesitate to offer his own views on controversial subjects. In discussing the upward curvature observed in Hixson–Crowell plots of the cube root of mass *versus* time, he suggests that deviations from straight-line behavior can be attributed to the lack of isometry of most real particles. He then proceeds to show how one can introduce a shape factor to correct for this deviation. In discussing angle of repose, he points out that the equations usually employed predict that as the particle diameter becomes smaller, the angle of repose approaches an infinite value rather than the value most consistent with the physical model, 90°. To remedy this, the cohesional and frictional coefficients are expressed in terms of trial functions with proper boundary conditions and an equation is obtained based on the force diagram for a powder heap.

Particularly lucid is his treatment of Prout–Tompkins kinetics of solid-state decomposition. Carstensen also shows how the boundary conditions of the Prout–Tompkins model can be modified to treat data that follow first-order kinetics.

Where appropriate, the text is augmented with solved quantitative examples, copious tables of empirical data, and more than 100 beautifully drawn, uncluttered, line figures. Those familiar with Carstensen's earlier treatments of this subject, "Pharmaceutics of Solids and Solid Dosage Forms" and "Theory of Pharmaceutical Systems," will see some of the same figures and numerical examples in the present volume, but repetition has been kept to a minimum. The problems are relatively easy and are mainly computational exercises.

One may make some minor criticisms of the book, especially with regard to topics such as lyophilization and spray drying, which are given short shrift. Symbols often are introduced without definition, and unconventional symbols are substituted unnecessarily for more familiar ones. For example, in the Bragg equation, R_0 rather than d is used for interplanar spacing. The Greek letter θ is used for time. More confusing, F is used for the Helmholtz energy rather than A. Formerly, of course, F was used in textbooks for the Gibbs free energy. There are a few errors. An exponent has been omitted in the Shotten–Hersey equation (V-3-24a). In the plot of water vapor pressure *versus* moles of water, one plateau for sodium phosphate is mislabeled (Fig. III-15). But these are minor points and in no way detract from my opinion that the author has treated a comprehensive set of difficult problems with excellent conceptual organization and clarity.

Pharmaceutical development scientists and graduate students who require a quantitative understanding of the operations related to the manufacture of solid dosage forms will find this slender volume very useful. It is not for casual reading, and the nonspecialist who wants a broad overview of the field will have to find it elsewhere.

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