as drug analysis or pharmaceutics, although the information contained in each volume can be used as reference material.

The volumes are highly recommended to any scientist who is actively involved in drug research and development.

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Handbook of U.S. Colorants for Foods, Drugs, and Cosmetics. By DANIEL M. MARMION. Wiley-Interscience, One Wiley Drive, Somerset, NJ 08873. 1979. 350 pp. 13.5 × 21 cm.

The purpose of this book is to give a general survey of the colorants used in the United States in foods, drugs, and cosmetics. The author divided his book into three approximately equal parts. The first one offers a concise, well-written summary of the regulations related to coloring agents. It deals with the permanent and temporary listing of the colorants and sums up their properties, specifications, permitted uses, and limitations.

The second part of the book is a useful survey of the qualitative and quantitative analytical procedures applied for the colorants and their impurities. The author describes a wide range of techniques such as column, paper, and thin-layer chromatography, thermal analytical methods [differential thermal analysis (DTA) and differential scanning calorimetry (DSC)], spectrophotometry, IR spectrometry, and NMR spectroscopy. Model spectra and thermograms help the reader to understand the interpretation of the plotted data. The selected examples are presented in simple, clear language with good diagrams where needed, and they can be followed easily by chemists or technicians with appropriate training in analytical laboratory techniques. A reasonably up-to-date bibliography in each chapter assists those who desire more theoretical background or technical details.

The last section of the book basically is an extended biography, with ample comments by the author, on the analysis of colorant mixtures and commercial products such as beverages, cosmetics, drugs, and meat. These chapters, of course, were not intended to cover every possible product or application; nevertheless, the selection is a good starting point for the analyst who has to solve problems in the analysis of color additives.

In summary, this book is a first in this area. While the scope is restricted to color additives used in the United States, the book also may help professionals in other countries who are manufacturing, controlling, or using colorants.

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CRC Handbook Series in Clinical Laboratory Science, Section B: Toxicology, Vol. 1. Edited by DAVID SELIGSON and IRVING SUNSHINE. CRC Press, 2255 Palm Beach Lakes Blvd., West Palm Beach, FL 33409. 1978. 414 pp. 19 × 26 cm. Price $54.95 ($62.95 outside the United States).

The preface states that "in the last few years, there has been a flood of scientific articles dealing with use and misuse of chemical agents. From this surfeit has come a plethora of data which need to be at the fingertips of many scientists." This volume is an attempt to fill that need.

The book consists of five chapters. The first and major chapter encompasses slightly over 300 pages or 75% of the book. This chapter is a detailed presentation of the chromatographic separation of drugs and chemicals. It is divided into several subsections including a basic introduction to chromatography, a presentation of GC, a presentation of TLC, and a final section on high-pressure liquid chromatography (HPLC). These sections include extensive tables on the methodology to be employed to separate hundreds of chemicals of interest to the analytical toxicologist. These tables include listings of numerous solvent systems, which are frequently indexed according to their R_f values. The section on HPLC is the least extensive of the sections on chromatography but is still a valuable introduction to the technology.

The second major chapter is on the immunoassay of drugs and includes a brief description of the development of radioimmunoassay. This chapter lists 70 drugs that can be quantitated by this technique and includes over 400 references.

The third chapter has microcrystalline tests for approximately 250 drugs and chemicals with references and explanations for each particular test.

The fourth chapter is a tabulation of solubilities of numerous antibiotics arranged in two tables. One table gives the solubility of 76 antibiotics in 24 solvents at 28°. The second table includes 53 additional antibiotics and their solubilities at 21° in 24 solvents.

The last chapter is a tabulation of approximately 600 chemicals arranged in ascending order of their melting points.

In summary, as stated in the preface, this book is a compilation of a large number of tables dealing with the separation and identification of toxic chemicals. The one drawback is that it takes a fair amount of time to become familiar with its organization since the tables frequently are extremely long. However, this book should be valuable to individuals involved with identifying chemicals in biological systems.

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Sustained and Controlled Release Drug Delivery Systems, Vol. 6. Edited by JOSEPH R. ROBINSON. Dekker, 270 Madison Ave., New York, NY 10016. 1978. 773 pp. 15 × 23 cm. Price $59.75.

The book starts with a standard overview of controlled-release delivery systems, but the inclusion of the role of disease states and of circadian rhythm makes the chapter stimulating. Chapter 2 also gives standard material with a brief discussion of liposomes. Reference 200 in this chapter is cited incorrectly. Salicylate, not aspirin, has a biological half-life of 6 hr. Chapters 3 and 4 discuss physical methods of obtaining a sustained-release drug delivery system.

Chapter 5, as written, seems totally irrelevant to the rest of the book and should have been omitted. Chapters 6 and 7 give interesting accounts of the prodrug and biomedical engineering approach. Chapters 8 and 9 give the classical pharmacokinetic picture of sustained-release systems.

In general, the book provides a current and comprehensive picture of the sustained-release product area and is recommended to anyone interested in understanding the principles, technologies, and applications of controlled-release drug delivery systems.

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Microcapsule Processing and Technology. By ASAJI KONDO. Edited and revised by J. WADE VAN VALKENBURG. Dekker, 270 Madison Ave., New York, NY 10016. 1979. 182 pp. Price $22.50.

This hard-bound book represents an edited English revision of the original text published in Japanese by Asaji Kondo in 1970. The first four chapters provide an in-depth discussion into the history, general principles, and applications of microencapsulation. The remaining 14 chapters examine various methods of preparing microcapsules. In all cases, the author attempted to simplify each system, with detailed explanations of the various procedures employed to manufacture microcapsules. Schematic diagrams, tables, and scanning electron micrographs are scattered liberally throughout the text and adequately illustrate the concepts under discussion. The bulk of the book is devoted to explana-

tions of process applications for the manufacture of paper, adhesives, plasticizers, copying materials, pigments, perfumes, and many other substances including drugs.

My biggest criticism of the book is that the original text by Asaji Kondo is 10 years old. As a result, the English version by J. Wade Van Valkenburg contains reference material published prior to 1970. However, microencapsulation is a highly patented field and several patents discussed in the book will expire in the 1980's. Therefore, the text could prove to be of great assistance to scientists working in this field.

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Catecholamines: Basic and Clinical Frontiers, Vols. I and II. Edited by E. USDIN, I. J. KOPIN, and J. BARCHAS. Pergamon Press, Maxwell House, Fairview Park, Elmsford, NY 10523. 1979. Vol I: 1003 pp. Vol. II: 946 pp. 17 × 25 cm. Price $200.00 per volume.

The material in both volumes represents the phenomenal growth of research in catecholamines. Although the impact of catecholamine research in medicine has been universal, this international symposium represents research carried out mainly in the United States, France, Sweden, Britain, and Germany. The opening chapter presents a coherent, concise, and important summary by the internationally respected scientist–teacher, Arvid Carlsson, concerning the impact of catecholamine research on medical science and practices.

Compared to the previous symposium, a meaningful morphology appears on many pages. Dopamine occupies the central theme with which other endogenous substances such as enkephalins, substance P, and γ-aminobutyric acid (GABA) are intertwined. Drug-induced side effects and their influence on neurochemistry receive only limited attention. The value of genetics in relation to psychotropic illness with or without coherent neurochemical markers is included. One occasionally sees a marked overlap between the material published in these symposia and that published elsewhere. In the present era of rapid scientific communication, publishing the same material repeatedly should be discouraged. Catecholamine receptors occupy a large section in Vol. I.

The cost of both volumes may produce mental and neurochemical disturbances in the poor scientist who may want to buy them, so only departmental and institutional purchases are recommended.

Reviewed by P. N. Patil
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Introduction to Powder Surface Area. By S. LOWELL. Wiley, 605 Third Ave., New York, NY 10016. 1979. 199 pp. 15 × 23 cm. Price $17.95.

The subject of micromeritics should be important to pharmaceutical scientists. The features of a powder, *e.g.*, particle size, shape, and area, can greatly influence product development and processing as well as the properties of the finished product. However, the articles published about powders often present complicated dissolution equations derived for idealized situations. Thus, the important term for powder surface area in many pharmaceutical papers is calculated from assumed particle distributions for regularly shaped, isotropic particles. The assumption of no pores, no surface irregularities, and no interparticle forces leading to aggregation is far from reality. It should be of interest in pharmacy to characterize powders in regard to actual surface area and then to seek valid relationships between area and powder behaviors. This book may provide the proper introduction into this field for many pharmaceutical scientists.

Lowell treats powder surface area and pore-size distribution mostly as a subject of gas adsorption. However, mercury porosimetry is discussed. The book is relatively small (199 pages) and is divided into two parts. The author discusses the theoretical bases for surface area measurements in the first part. The topics discussed in these first 11 chapters also may be found in books on surface chemistry or particle-size measurement, but Lowell's presentation is clear and generally easy to follow. For example, in Chapter 5, he carefully leads the reader through the Brunauer, Emmett, and Teller theory using 25 equations.

The second section, the experimental section, should be quite helpful to those entering the field of surface area measurement. The basic techniques are described, but the narratives on vacuum volumetric methods (Chapter 13) and particularly on dynamic flow methods (Chapter 14) are somewhat less clear than the discussions in the first part of the book. Quick comparisons on various points (gas mixtures, calibration, speed, *etc.*) of the three important gas adsorption techniques (*i.e.*, vacuum volumetric, continuous flow, and gravimetric methods) are given in Chapter 17.

One frustrating feature of this book is the large number of typographical and content errors. These errors reduce reader confidence in the text. Many of these are immediately recognizable as errors but some are not. Thus, while trying to understand the vacuum volumetric method in Chapter 13, we depend on Eqs. 13.3–13.8 to help, not hinder, us. Here, a simple sign error can lead to considerable confusion.

The real advantage of this book may be psychological. The author has separated the topic from the generally larger subject of particle-size measurement. By limiting the topic, he has made it possible for us to become more immediately interested in surface area measurement and, perhaps, more willing to use such measurements.

Thus, this book should be worthwhile for self-study or as a basic reference and should be recommended to pharmaceutical scientists. Nevertheless, it is only an introduction. The implication given on the dust cover that meaningful measurements of powder surface areas will immediately result from study of this book is probably too optimistic.

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