

REVIEWS

Thin-Layer Chromatography. Edited by EGON STAHL. Springer-Verlag New York, Inc. 175 5th Ave. New York, NY 10010, 1969. xxiv + 1041 pp.

Egon Stahl's *Thin-Layer Chromatography* (second edition) is the most complete and current compilation of TLC theory and practice available today. The book, published in 1967 in German, is an expansion of his first work, organized in much the same manner. There is the same review of nomenclature before each compound class, the same history, and a much expanded theory section covering new apparatus and additional techniques.

The book has a much more complete section on heterocyclic nitrogen compounds than Kirchner's *Thin-Layer Chromatography*. Phenothiazines, the diazepines, carbamate esters, compounds of antihistamine activity, and the narcotics are all more thoroughly covered by Stahl than in the other available books on the market. Moreover, most charts list the structural formula where feasible or the chemical name of the compound in addition to its common name. The amino acid section is also well done. There is an extensive listing of general test conditions and solvent systems for these compounds.

The volume, however, is not specific in its treatment of the steroids. For the most part, it lists general systems for the various groupings of steroids and does not treat each drug individually. An incomplete and inconsistent index is also a hindrance, varying between listing drugs as to their activity, group name, or the name of one compound in the group. However, no existing TLC handbook approaches the amount of data contained in this volume and, as such, this work is a definitive addition to any TLC library.

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Cationic Surfactants. Vol. 4. Edited by ERIC JUNGERMANN. Marcel Dekker, New York, NY 10016, 1970. xiv + 652 pp. 16 × 23.5 cm. Price \$37.50.

This, the fourth volume in Dekker's Surfactant Science Series, is concerned with the organic, physical, and analytical chemistry of cationic surfactants. A fourth section deals with the biological aspects of this class of surfactants.

The eighteen authors are drawn from both industry and the universities. Following an introductory chapter, the next six chapters deal with the synthesis of straight chain and cyclical alkylammonium compounds, petroleum-derived and polymeric forms, and nonnitrogen-containing surfactants. Brief references to the applications, physical properties, and toxicities of the compounds under discussion are made. As would be expected, major emphasis is placed on commercial products. Considering the potentially unexciting subject matter, the presentation is clear and readable.

There then follows a group of six chapters concerned with the physical chemistry of cationic surfactants. Specific topics covered are micelle formation in aqueous and nonaqueous media, adsorption by a variety of substrates, and coacervation. A brief section on adsorption on biological substrates has obvious pharmaceutical implications. In most cases the treatment is sufficiently basic; inevitably, much of the discussion is common to all classes of surfactants.

A single chapter comprises the section on the analytical chemistry of cationic surfactants. The approach taken is a practical one, with emphasis placed on methods that have been developed for carefully purified surfactants. The chapter considers both qualitative and

quantitative aspects of analysis. Most discussion of the latter centers around absorptiometric, volumetric, and gravimetric analysis.

The final section, on the biology of these compounds, contains two chapters that review the germicidal properties and toxicology, respectively, of cationic surfactants. In the chapter on germicidal properties, little consideration is given to a discussion of the mechanisms of action involved. However, the descriptive literature in this area is covered satisfactorily. Cationic surfactant toxicology is well summarized in the final chapter, which also contains a comprehensive listing of reported toxicities.

While this text undoubtedly represents a comprehensive presentation on cationic surfactants, its major appeal to the pharmaceutical scientist will probably be limited to the last two sections which comprise approximately one-third of the total material.

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Pharmaceutical Chemistry, Volume 2: Instrumental Techniques.

Edited by L. G. CHATTEN. Marcel Dekker, Inc., 95 Madison Ave., New York, NY 10016, 1969. xiv + 773 pp. 17 × 24 cm. Price \$17.75.

Eighteen authors and the editor have collaborated to present 19 chapters in this second volume of a two-volume set on the analytical aspects of pharmaceutical chemistry. When the objectives stated in the preface are compared with the final written work, this reviewer finds that, in general, the mission has been accomplished. In an attempt to evaluate this book, each chapter has been examined and the following comments are respectfully set down.

The chapters may be conveniently divided into three groups: (1) topics involving electromagnetic radiation; (2) topics dealing with electrochemistry; and (3) subjects not classified as either (1) or (2). In many cases, questions, problems, and answers as well as experiments have been provided.

The first group of items is concerned with analytical techniques utilizing electromagnetic radiation in its various forms. The first two chapters concerning absorption spectrophotometry in the visible and ultraviolet region and in the infrared are well written and employ pretty much the standard approach to the subjects. In the first case, spectrophotometric titrations and a welcome treatment of the chemistry of chromogenesis in some colorimetric analyses are included. The presentation of structure-spectra correlations is done well; unknown spectra are provided for practice and study.

In both chapters, the experiments are appropriate but the instrumental features receive only brief attention. Raman spectroscopy, becoming more useful as instrument prices diminish, is discussed in a separate chapter. The theory is examined carefully and requires an appreciation of group theory and fundamental spectroscopy for adequate understanding. At present, no good examples of the application of this technique to pharmaceuticals are evident.

In the division of fluorometry, the explanations of theory, derivations of equations, and the examination of pharmaceutical examples are excellent. Particularly noteworthy is the portion discussing spectra-structural correlations. The choice of experiments includes the study of the physiological availability of riboflavin. The 16 pages of the atomic absorption chapter are used with efficient economy, the various points being well presented. This simple technique is certain to be used to a much greater extent than it is today. The qualitative elucidation of the nuclear magnetic resonance phenomena is clearly written as is the section of interpretation of spectra, so very useful in organic compound identification. There is little quantitative work in this area, however. Turbidimetry and

related methods are presented together, but the discussion is somewhat difficult to read. Many equations are introduced and the treatment includes light-scattering measurements. Numerous references are listed and classified, but the single experiment chosen is disappointing. It was hoped that some work in light scattering might be suggested.

Refractometry and polarimetry are discussed in two relatively short sections. The theoretical discussion of refractometry is good and the use of this property in monitoring chromatographic eluants and in structural studies is presented together with its well-known application in liquid identification. The theory involving polarimetry and related properties, such as optical rotatory dispersion and circular dichroism, is most complex and cannot be handled in a few pages as is evident from this chapter. The discussion of circularly and plane polarized light and the resolution of the former into the latter is not quite clear. Optical rotatory dispersion is treated in terms of the octant rule. The proposed experiments deal with pharmaceutical compounds or preparations and are good. Unfortunately, quantitative analysis by polarimetry is limited by lack of instrumental sensitivity.

Crystallography is introduced in a chapter which describes properties that are measurable optically. Although most interesting, the work proved very hard to read. Concomitant performance of the suggested experiments seems necessary. Possibly the use of photomicrographs, colored if colors are to be seen, together with diagrams using various colors to emphasize coordinate axes, angles, and lines would have improved this important section. The techniques of X-ray analysis in terms of topics such as powder diffraction, single crystal studies, and X-ray fluorescence are part of a chapter that reads well and cites good pharmaceutical examples, both in cases of identity study and quantitative determinations. Considering the analyses possible with the powder technique and the trace level detection possible when fluorescence is measured, it is disappointing that some experiments are not proposed for those fortunate enough to have an X-ray spectrometer.

Electrochemical topics are covered in five chapters. The presentation on potentiometry is rather standard and includes a discussion of electron tubes and some simple circuits. However, the use of 12 photographs of commercial instruments and injudiciously plotted curves is not making the most of space. The omission of specific ion electrodes is surprising. The conductimetric and high-frequency methods are discussed in a chapter entitled *Current Flow Methods*. The discussions are done well and include measurement circuits and Wheatstone bridge concepts with a description of critical micelle measurements. Coulometry and chronopotentiometry are written in a direct, crisp, clear, readable style. The pertinent equations and the salient differences between the techniques are made plain. At the end of each subsection, the pharmaceutical applications are listed and an experiment using an appropriate pharmaceutical is supplied for each technique.

The polarography and amperometry chapters are well done. The various equations necessary for polarography are derived, and concepts are lucidly introduced and developed. In addition to classical polarography, solid microelectrodes and measurements in non-aqueous media are discussed. The commentary on instrumental aspects is pertinent, and the experiments and summary of pharmaceutical applications are good. It was disappointing not to find any mention of AC polarography. Both one- and two-polarized electrode systems used in amperometric titrations are considered and the applications to pharmaceuticals are summarized.

The final group of topics includes chapters on mass spectrometry, gas chromatography, and radiochemistry. The survey of mass spectrometry begins with a good introduction to theory, but the study of fragmentation patterns clearly requires more intense work than could be presented in the available space. Although good use has been made of this technique, together with pyrolysis and gas chromatography with simplified interpretation by means of computer techniques, the utility in quantitative analysis, discussed in this section, has not been established. Gas chromatography is developed in the usual manner and seems generally satisfactory. However, the discussion of the detectors and their mode of operation is disappointing, as is the omission of pyrolysis techniques. Likewise, the choice of experiments is not imaginative with work such as the separation of steroids and the monitoring of barbiturates in the

urine published in the literature. The closing chapter on radiochemistry presents a logical development of the theory and measurements appropriate to this area. However, the very important aspect of radiation safety procedures, decontamination, and waste disposal, as well as radioaseptic techniques, has not been included. The experiments are disappointing; it was hoped that procedures such as neutron-activation analysis (if a neutron source is available), scintillation spectrometry, or nuclide standardization and calibration would be included.

This reviewer recommends that this book be considered as a text for a course in instrumental analysis. It may be necessary to supplement this work from many available sources if some aspects of electronics or instrumental function and design are to be taught. But this is not a serious drawback since this text presents the analysis of pharmaceuticals, information not available in a text at this level before.

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Consulting, Establishing and Maintaining An Independent Practice

By RICHARD A. STEMM. SiSi: Stemm's Information Systems & Indexes, P. O. Box 42576, Los Angeles, CA 90050, 1970. iii + 29 pp. 13.5 x 21 cm. Price \$2.50.

Despite its brevity, this booklet, written by Richard Stemm, contains a vast amount of information for the practicing or aspiring consultant. The author states in the Preface that the primary value of the publication is helping an individual objectively plan and prepare a course of action to establish himself as an independent consultant.

The material appears to be applicable to individuals in most fields and specialties. Among the topics covered are proposing, quoting, negotiating, contracts, fees, and costs. The booklet also contains forms for the National Consulting Register, a division of the author's organization.

Staff Review

Codeine and Its Alternates for Pain and Cough Relief. By NATHAN B. EDDY, HANS FRIEBEL, KLAUS-JURGEN HAHN, and HANS HALBACH. World Health Organization, Geneva, Switzerland, 1970. i + 253 pp. 17.5 x 24 cm. Price \$6.00.

This review of the analgesic and antitussive effects of codeine and its alternates was originally published, in five installments, in the *Bulletin of the World Health Organization* during 1968 and 1969.

The five chapters included are codeine, exclusive of its antitussive action; alternates for pain relief; the antitussive action of codeine—mechanism, methodology, and evaluation; potential alternates for cough relief; and discussion and summary.

Codeine, which has been used increasingly for the relief of pain and cough since it was first isolated in 1832 from morphine, is an effective analgesic and antitussive either alone or in combination with other compounds. This publication reviews the literature concerning the experimental and clinical effectiveness of codeine and a wide range of alternative substances.

Effectiveness and lack of undesirable side-effects, including tolerance, dependence, and liability to abuse, are among the leading characteristics to be considered in the evaluation of codeine and its potential alternates. These aspects are taken up in this review.

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