

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.

Reviewed by Thomas Medwick
College of Pharmacy
Rutgers University
Newark, NJ 07104

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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