chloride-induced contractions. The inhibition was reversible and the spasmolytic ED_{50} was 0.82 μg/ml. Bufotenidine and tubocurarine, in parallel assays, showed spasmolytic ED_{50}'s of 1.45 and 1.38 μg/ml, respectively. Subsequently, the effect of the quaternary dimeric alkaloid (V) to hasten the reversal of tetanic response due to neostigmine (0.3 mg/kg iv) on sciatic nerve–gastrocnemius muscle preparation of albino rats (10) was studied. The response, in absence of the test compounds, started recovering in about 10–15 min and was almost completely recovered by 30–40 min. The reversal process was brought to completion by 10–15 min after the administration of bufotenidine (I, 0.2 mg/kg iv), bisbufotenidine analog (V, 0.01 mg/kg iv), or tubocurarine (0.015 mg/kg iv).

The curarimimetic activity of V was also tested in chicks according to the method described by Lewis (11). The test compounds were injected intravenously through the alar vein in groups of 10 chicks. All three compounds showed flaccid paralysis of the limbs with flexion of the head of chicks in doses of 50, 4, and 10 μg for I, V, and tubocurarine, respectively. From these results, it appears that the bisbufotenidine analog could be of potential therapeutic importance as a muscle relaxant. The nominal side effects encountered during its routine pharmacological screening may not pose any serious obstacle to its possible use as an adjuvant to anesthesia.

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BOOKS

REVIEWS

Pharmaceutical Calculations. By JOEL L. ZATZ. Wiley, 605 Third Ave., New York, NY 10016, 1973. 311 pp. 17 × 25.5 cm. Price $7.95.

Using the format of linear programming with occasional branched remedial sequences, this book adequately presents the most important aspects of pharmaceutical calculations. The book actively involves the student in the learning process by requiring frequent responses and solutions to short questions and problems. The material is presented in 11 chapters covering the interconversion of pharmaceutical systems of weights and measures, elementary prescription notation and drug dosing, formula adjustment, calculation of percentages and other expressions of concentration, stock solutions, dilutions and concentrations, and milliequivalents. Zatz is careful and thorough in his presentation of unit labels in the basic review of mathematical operations and in his treatment of scientific notation. Accuracy of measurement using pharmaceutical equipment is conveniently linked to a presentation of factors affecting percent error and ways of determining significant figures.

The first seven chapters contain useful concise statements of objectives and goals, usually with some indication of the competence the student may be expected to achieve from a study of each chapter. The last four chapters are not consistent in their introductions, thereby losing some of the cohesiveness of the book. Furthermore the use of a cumbersome and oftentimes confusing symbol for minim, coupled with the dual use of the letter j as a general symbol for an unknown quantity as well as the final "i" in a roman numeral, represents typesetting shortcomings of this first edition that can seriously mislead all but the most astute students. For all of his intent to present problems and methods in a logical straightforward manner, the author makes the student unnecessarily dependent upon the arbitrary use of ratios and proportions in a large number of problem groups.

While the book may be helpful to some students undertaking individualized or self-paced study in pharmaceutical calculations, it will be most useful in a course where it finds companion explanation and clarification by the professor, particularly in the areas of methods and rationale for the calculation of apothecary percent w/v and ratio strength. The book can function as a helpful guide and workbook for the student, but its contents may require supplementary problem sets for mastery. The book is generally effective in its scope, variety of problems, and presentation style. It

does warrant a place in the pharmacy library and on the booklists of students. Finally, Zatz's book should be helpful to practitioners and pharmaceutical scientists who wish to review one or more aspects of calculations and drug dosing.

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The National Formulary, Fourteenth Edition. Prepared by the National Formulary Board with the approval of the Board of Trustees, by authority of the American Pharmaceutical Association. Published by the American Pharmaceutical Association, 1974. Distributed by Mack Publishing Co., 20th & Northampton Sts., Easton, PA 18042. lxxix + 1124 pp. 14.5 × 23.5 cm. Price $24.00 (domestic and foreign).

In view of the recent acquisition of the National Formulary by the United States Pharmacopeial Convention, Inc., this latest edition of the National Formulary (NF XIV) proves to be a fitting vehicle, even if not so originally designated, for the National Formulary Board of the American Pharmaceutical Association to conclude its traditional responsibilities in setting forth standards of identity, strength, quality, purity, packaging, storage, and labeling of drugs and related articles. Maintaining the policy established for the two previous editions, the recognition of drug substances provided for the admission of articles only on the basis of their therapeutic value.

Of the total of 1009 articles recognized as therapeutic agents or pharmaceutic aids in NF XIV, 318 are newly admitted. The articles newly admitted to NF XIV are broadly representative of classes of agents valuable in modern therapeutics including antibacterials (cephaloglycin), antihypertensives (pentolinium tartrate), antineoplastics (floxuridine), antipsychotics (thiothixene), diagnostic aids (macroaggregated iodinated I 131 serum albumin), and immunizing agents (inactivated mumps virus vaccine). In addition to the monographs, general test chapters, reagent specifications, and general information chapters comprise one-fifth of this edition.

As a result of the efforts of the USP–NF Joint Panel on Primary Requirements, the NF XIV and USP XIX General Notices and Requirements do not differ from each other in substance or intent with regard to the interpretation and application of the official standards, tests, assays, and other specifications—although major differences are noted in the section pertaining to the information included under *Categories and Doses* (*Categories, Doses, and Dispensing Information* in USP XIX). Substantial changes have been made, however, with respect to the General Notices of both previous compendia volumes.

Several new features differentiate NF XIV from the previous edition, NF XIII. The monographs for articles recognized as therapeutic agents and those for articles recognized as pharmaceutic aids are presented in separate sections. Following the principle promulgated by the USAN Council, the word order for monograph titles of most organic compounds ensures that the pharmacologically active portion appears first; *e.g.*, Butabarbital Sodium instead of Sodium Butabarbital as used in NF XIII. Additionally, the assistance of the USAN Council was sought for the purpose of obtaining specific recommendations for complying with provisions of the Federal Food, Drug, and Cosmetic Act regarding the use of "simple and useful names." As a direct result, several new official names appear in NF XIV, replacing either previously official compendia names or previously established names for the article (in the case of articles newly admitted to NF XIV). The chemical data section has been expanded to include the current Chemical Abstracts indexing name that utilizes the recently revised Chemical Abstracts nomenclature system. The Chemical Abstracts Service (CAS) registry numbers have also been added to this section.

A new monograph format was adopted to provide a distinctive manner for setting aside the informational matter, such as category, dose information, sizes available, description, and solubility, that is of particular interest to pharmacists and other users of the compendium. The official definition follows this informational section; the monograph standards, test procedures, and specifications follow the official definition in the familiar two-column format which has been utilized in recent NF editions. However, those specifications and requirements of primary concern for pharmacy practitioners—those regarding packaging, storage, and labeling—have been removed from the end of the monograph (their placement in NF XIII) and prominently placed immediately below the official definition and preceding the chemical tests and assays.

Specific revisions in the compendial tests and assays include the extension of content uniformity requirements to sterile suspensions in addition to their application to tablets, capsules, and sterile solids; the adoption—with caution—of the concept of system suitability tests in procedures using complex instrumentation, as a means of establishing that the entire analytical system is functioning properly to successfully complete the specified test or assay; and the use of newer analytical techniques, such as nuclear magnetic resonance spectroscopy in the case of amyl nitrite, to ensure drug standardization. Where applicable, a new specification entitled *Reference standards* that describes the pertinent storage and drying conditions (unless otherwise indicated in the monograph) for the reference standard materials used in the monograph procedures has been added.

The inclusion in this edition of new general test chapters for procedures such as high-pressure liquid chromatography, nuclear magnetic resonance spectroscopy, and thermal analysis provides for the application of the most advanced knowledge and sophisticated analytical techniques to compendial requirements. The inclusion of the new general test chapter entitled *Containers—Permeation* realizes the proposed official standard for tightness of drug containers that was announced by the NF Board in January 1974.

The individual sections pertaining to general information, reagent specifications, and index complete this volume.

Purchasers of the bound volume of the NF XIV are entitled to receive the *First Supplement* (a composite first supplement with that for USP XIX) at no additional charge. This supplement was published in April and will become official simultaneously with the main volume (July 1, 1975). And, since the American Pharmaceutical Association has relinquished its responsibility for the National Formulary to the United States Pharmacopeial Convention, Inc., all correspondence relating to supplements, standards specifications, and ordering of NF reference standards should be addressed to the National Formulary, 12601 Twinbrook Parkway, Rockville, MD 20852.

The consolidation of NF and USP, to quote Dr. John V. Bergen from his *Preface* to NF XIV, "carries the enthusiastic endorsement and support of the National Formulary Board, which believes this action to be in the best interest of the official compendia, of the professions of pharmacy and medicine, and—most important—of the public . . . [and provides a] new compendial organization which represents a combined voice, a combined resource, and a combined scientific and professional force in drug standardization."

Staff Review