

and nonalkylating inhibitors bind less efficiently to the enzyme than folic acid ($K_M = 6.2 \times 10^{-6} M$). Variation of the chain length of the 6-substituent has a relatively small effect on the $[I/S]_{50}$ ratios for both the alcohols (III-VII, $[I/S]_{50}$ range, 2.9-5.6) and the chloro compounds (VIII-XII, $[I/S]_{50}$ range, 1.9-3.0). However, incubation of the enzyme with the inhibitor before addition of the substrate resulted in varying degrees of irreversible inactivation of the enzyme. Enzyme inactivation in the presence of the reversible inhibitors (III-VII) was identical to that occurring in the absence of these inhibitors.

The data presented in this communication seem to establish the existence of a nucleophilic site on the enzyme folic acid reductase that can be specifically alkylated by appropriately designed antagonists. Further work is in progress, using analogs of these antagonists, that may further establish the position of this nucleophilic site relative to other binding sites of folic acid reductase.

- (1) Baker, B. R., *J. Pharm. Sci.*, **53**, 347(1964).
- (2) Lawson, W. B., and Schramm, H. J., *J. Am. Chem. Soc.*, **84**, 2017(1962).
- (3) Lawson, W. B., and Schramm, H. J., *Biochemistry*, **4**, 377(1965).
- (4) Schoellmann, G., and Shaw, E., *Biochem. Biophys. Res. Commun.*, **7**, 36(1962).
- (5) Schaeffer, H. J., and Odin, E., *J. Pharm. Sci.*, **54**, 1223(1965).
- (6) Timmis, G. M., Felton, D. G. I., Collier, H. O. J., and Huskinson, P. L., *J. Pharm. Pharmacol.*, **9**, 46(1957).
- (7) Modest, E. J., Schlein, H. N., and Foley, G. E., *ibid.*, **9**, 68(1957).
- (8) Tanaka, K., Kaziwara, K., Aramaki, Y., Omura, R., Araki, T., Watanabe, J., Kawashima, M., Sugawa, T., Sanno, Y., Sugino, Y., Ando, Y., and Imai, K., *Gann.*, **47**, 401(1956).
- (9) Roy-Burman, P., and Sen, D., *Biochem. Pharmacol.*, **13**, 1437(1964).
- (10) Hampshire, J., Hebborn, P., Triggle, A. M., Triggle, D. J., and Vickers, S., *J. Med. Chem.*, **8**, 745(1965).
- (11) Hampshire, J., Hebborn, P., Triggle, A. M., and Triggle, D. J., unpublished data.
- (12) Werkheiser, W. C., *J. Biol. Chem.*, **236**, 888(1961).

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Books

REVIEWS

Accepted Dental Remedies 1966. Council on Dental Therapeutics. American Dental Association, 222 E. Superior St., Chicago, Ill. 60611, 1965. xvi + 275 pp. 15 × 22.5 cm. Price \$3.00. Paperbound.

The 1966 edition is the thirty-first edition of this well-known handbook of dental therapeutics. Revision once again has resulted in changes in the organization of the material and division into five sections; the previous edition had three. Of the five sections, one represents new material—Therapeutic Guides. The indexes have been incorporated into the fifth section, and the first three—General Principles of Medication, Therapeutic Agents, and Therapeutic Aids—remain the same.

Therapeutic Guides includes a chapter in which conditions such as bleeding, hairy tongue, moniliasis, leukoplakia, etc., are discussed and suggestions for treatment given. Another new chapter is Current Therapeutic Trends in which brief monographs on recently marketed drugs are presented. These drugs are widely advertised, and although some may eventually be accepted by the Council, others are included especially to emphasize the hazards associated with their use.

The discussion on reporting drug reactions has been expanded. The Council on Therapeutics is now cooperating with the FDA in its program on adverse reactions and to further aid the practitioner, brief adverse reaction report forms have been included inside the back cover of the book.

Basic Biochemistry. By M. E. RAFELSON, JR., and S. B. BINKLEY. The Macmillan Co., 60 Fifth Ave., New York 11, N. Y., 1965. xi + 350 pp. 15.5 × 24 cm. Price \$8.50 hardbound; \$6.50 paperbound.

This brief textbook provides a basic outline of the principles of biochemistry. The material is presented in a clear and readable style. Discussion is limited but this fact is acknowledged by the authors who suggest more complete reference texts which can be consulted for supplementation of this material. The first few chapters are devoted to descriptive chemistry of acids, bases, and buffers; carbohydrates; lipids; proteins; nucleic acid and nucleoproteins; enzymes; and high energy compounds and oxidative phosphorylation. The remaining chapters are devoted to the metabolic pathways which utilize these compounds. The text

throughout is illustrated with many structural formulas, some of which are often not presented in more advanced texts since it is assumed that they are known.

New Drugs: 1965 Edition. Evaluated by A.M.A. Council on Drugs. American Medical Association, 535 N. Dearborn St., Chicago, Ill. 60610, 1965. xii + 510 pp. 16 × 24 cm. Price \$5.00

New Drugs 1965 is a new publication of the American Medical Association's Council on Drugs. The Council has discontinued its previous publication, *New and Nonofficial Drugs*. The hope is that *New Drugs* will provide the practicing physician with a more usable reference. The scope, organization, and format are entirely different from earlier publications.

The approach to the discussion of drugs is therapeutic and drugs are grouped into chapters according to use. Previous publications categorized drugs according to pharmacologic action. For instance, in *NND*, antidepressants, and analeptics were both included in the chapter covering central stimulants. In *New Drugs* there is a separate chapter discussing each category.

The general discussion which begins each chapter covers many of the drugs available for that particular therapeutic use regardless of whether a monograph is included in the chapter. Monographs appear only for those drugs which have been introduced within the past 10 years.

The monographs provide unbiased information on the drugs and the Council emphasizes that these are not approved drugs; in some cases unfavorable evaluations are given. It is pointed out also in certain instances that a drug may be used for a particular condition, but further evaluation is necessary to substantiate its value. A total of 271 single entity drugs are covered in this edition. The information included in the monograph includes generic and chemical name, actions and uses, adverse reactions and contraindications, pharmacology, dosage, preparations available, trade name(s), and manufacturer(s).

New Drugs will be revised and published annually. Monographs for drugs over ten years old will be dropped and newer agents will be added, and as more information is gained about drugs still included, these monographs will be revised to incorporate this information.

Hawk's Physiological Chemistry. 14th Ed, Edited by BERNARD L. OSER. McGraw-Hill Book Co., 330 West 42nd Street, New York, N. Y., 1965. xv + 1472 pp. 16.5 × 23.5 cm. Price \$19.50.

The title of the book has been changed with this 14th edition from its original title *Practical Physiological Chemistry* to *Hawk's Physiological Chemistry*. This timely volume is the result of the collaborative efforts of scientists and researchers outstanding in the many aspects of the biochemical field. *Hawk's Physiological Chemistry* is a comprehensive text which includes modern theory and practice without losing sight of the fundamental concepts and methodology which have historically constituted the structure of the science of biochemistry.

This 14th edition contains several innovations in nomenclature and abbreviations. Some of the older terminology has been modified to conform with recommendations of the International Union of Biochemistry. For example, readers will notice that NAD or nicotinamide adenine dinucleotide is used in place of DPN, Coenzyme I, or diphosphopyridine nucleotide and that its reduced form is abbreviated NADH₂. In keeping with this, NADP or nicotinamide adenine dinucleotide phosphate replaces TPN, Coenzyme II, or triphosphopyridine nucleotide; its reduced form is NADPH₂.

Some of the subjects receiving special emphasis in this new edition are the composition, configuration, and role of the nucleic acids and related compounds; the enzymes and cofactors involved in metabolic pathways; the biotransformations of nutrients and their metabolites and their estimation in blood and tissues; the use of radioisotopes for the study of metabolic processes; current concepts of the biochemistry of muscular contraction, blood coagulation, respiratory metabolism, detoxification, and so forth. The initial chapters of this book deal with basic physicochemical principles and with the chemistry of the major components of physiological tissues. This sophisticated discussion of the chemical principles important to biochemistry is clearly expressed in surprising detail. The information in all chapters is well documented for further study. Each chapter or section contains analytical procedures and instrumental techniques which may be used as laboratory experiments or aids to the researcher. Some of these procedures and techniques are new, replacing those no longer in wide use. However, many examples of the older, perhaps less precise, procedures have been retained because of their continued usage or historical importance. The reader will find numerous diagrams, illustrations, and tables throughout the text. Particularly noteworthy is the color print of a model of the molecular structure of deoxyribose nucleic acid in the frontispiece which is symbolic of the recent epoch-making developments in the elucidation of the structural configuration and biochemical and genetic significance of the ribonucleotides. This comprehensive textbook in physiological chemistry should prove indispensable to those in the medical and allied professions.

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Official Methods of Analysis of the Association of Official Agricultural Chemists. Edited by WILLIAM HORWITZ. Association of Official Agricultural Chemists, P.O. Box 540, Benjamin Franklin Station, Washington, D. C. 20044, 1965. xx + 957 pp. 18 × 26.5 cm. Price \$22.50.

The changes and advances in analytical techniques are revealed in this 10th edition of *AOAC Official Methods of Analysis*. The major portion of new methods adopted within the last five years utilize spectrophotometry and/or chromatography. The methods presented in this book are required by regulatory and research workers in the various areas of agriculture and public health. They are used by the FDA, Department of Agriculture, Internal Rev-