gradient of hydrochloric acid (0 to 1 M in 2 L). The effluent material with absorbance at 280 nm was collected, concentrated, and precipitated with anhydrous ethanol. The white solid was filtered and dried in vacuo: yield 1.21 g (52%); mp 230–232 °C; $R_f$ (AMP) 0.67; UV $\lambda_{max}$ 259 nm ($\epsilon$ 14 970); $^1$H NMR ($D_2O$, pD 8) $\delta$ 3.43 (m, 2 H, $H_{5'}$), 4.5 (m, 2 H, $H_{2'}$ and $H_{4'}$), 4.7 (s, HOD and $H_{3'}$), 6.03 (d, 1 H, $J$ = 5.1 Hz, $H_{1'}$) 8.15 (s, 1 H, $H_8$), 8.3 (s, 1 H, $H_2$); $^{13}$C NMR ($D_2O$, pD 8) 56.76 ($C_{5'}$), 76.64 and 77.03 ($C_{2'}$, $C_{3'}$), 83.1 ($C_{4'}$), 91.26 ($C_{1'}$), 121.31 ($C_5$), 142.78 ($C_8$), 151.4 ($C_4$), 155.26 ($C_2$), 157.96 ($C_6$). Anal. ($C_{10}H_{13}N_5O_6S\cdot0.5H_2O$) C, H, N.

**9-(3-Deoxy-β-D-arabinofuranosyl)adenine-3′-sulfonic Acid (4).** 9-(2,3-Anhydro-β-D-lyxofuranosyl)adenine[21] (0.23 g, 1 mmol) and sodium hydrogen sulfite (0.5 g, 5 mmol) were suspended in a mixture of acetonitrile (20 mL) and water (10 mL). This mixture was heated to 80 °C, to give a homogeneous solution, under an atmosphere of nitrogen for 48 h. The reaction mixture was cooled to ambient temperature and acidified (pH 2–3) with 10% hydrochloric acid (to decompose excess sodium hydrogen sulfite). The solution was then concentrated, under reduced pressure, to about one-third its original volume and applied to a column (1 × 20 cm) of Dowex 50 ($H^+$ form, 200–400 mesh). Development with water resolved two peaks (as determined by $A_{280}$). The first one had a $\lambda_{max}$ of 250 nm and an $R_f$ (AMP) of 0 by electrophoresis and the second had a $\lambda_{max}$ of 258 nm and an $R_f$ (AMP) of 0.52 by electrophoresis. The fractions corresponding to the second peak were pooled and concentrated, under reduced pressure, to give yellowish white crystals (0.18 g, 65%). A portion was recrystallized from water to give a 50% yield of white crystals, mp >260 °C dec; UV (pH 4.9) $\lambda_{max}$ 258 nm ($\epsilon$ 13 780); $^1$H NMR ($D_2O$, pD 8) $\delta$ 3.69 (dd, 1 H, $H_{3'}$, $J$ = 5 Hz), 4.04 (m, 2 H, $H_{5'}$), 4.47 (m, 1 H, $H_{4'}$), 4.93 (t, 1 H, $H_{2'}$, $J$ = 5 Hz), 6.3 (d, 1 H, $H_{1'}$, $J$ = 5.1 Hz), 8.1 (s, 1 H, $H_8$) and 8.3 (s, 1 H, $H_2$); $^{13}$C NMR ($D_2O$, pD 8) 64.71 (t, $C_{5'}$, $J$ = 138.25, 142.66 Hz), 67.64 (d, $C_{3'}$, $J$ = 138.25 Hz), 75.5 (d, $C_{2'}$, $J$ = 150 Hz), 82.06 (dd, $C_{4'}$, $J$ = 148.9 and 5.15 Hz), 87.85 (d, $C_{1'}$, $J$ = 167.66 Hz), 120.53 (d, $C_5$, $J$ = 10.29 Hz), 143.86 (d, $C_8$, $J$ = 216.93 Hz), 151.0 ($C_4$), 155.16 (d, $C_2$, $J$ = 202.93 Hz), 157.89 (d, $C_6$, $J$ = 13.97 Hz). Anal. ($C_{10}H_{13}N_5SO_6$) C, H, N, S.

**Enzymology.** The horse liver alcohol dehydrogenase enzyme (EE isoenzyme) was purified and assayed as previously described.[28] The inhibition constants of the nucleotide analogues were determined by competition against varied concentrations (4–20 μM) of purified $NAD^+$ at a constant concentration of ethanol (5 mM) at 25 °C, in 33 mM sodium phosphate buffer, pH 8. A Hitachi MPF2A fluorimeter was used with excitation at 340 nm and emission at 420 nm. The data were fitted to the equation for competitive inhibition.[29]

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(28) R. T. Dworschack and B. V. Plapp, *Biochemistry*, **16**, 111 (1977).
(29) W. W. Cleland, *Adv. Enzymol.*, **29**, 1 (1967).

# Book Reviews

**Anthracyclines: Current Status and New Developments.** Edited by Stanley T. Crooke and Steven D. Reich. Academic Press, New York. 1980. xiii + 444 pp. 16 × 23.5 cm. $27.50.

The anthracyclines, typified by adriamycin and daunomycin, are widely employed agents in the treatment of human cancer. According to the editors, the purpose of this book is to provide an overview of recent progress in the study of anthracyclines and to provide a framework for developing new directions for future research. In 28 chapters the book is partially, but not completely, successful at meeting these objectives. Because the prototype agents have proven so useful in cancer chemotherapy, there has been a high level of activity in the development of anthracycline analogues. This book makes accessible in one place a definitive amount of facts on the chemistry, pharmacology, and antitumor properties of the most important of the newer drugs. Also, a great deal of attention is paid to the toxicities of this class of agents, especially to the most serious problem of cardiac toxicity. There are several chapters dealing with model systems for evaluating cardiac damage, giving a good overview of both the problems in this area and the promising reduction in cardiotoxicity of several of the newer agents.

The weakness of the volume is that none of the authors takes a broad view of the whole anthracycline field. There is no attempt to review and tie together all the various lines of research into these drugs or to speculate on unifying principles. Also, the absence of an index makes it difficult for the reader to do his or her own cross-referencing. Some topics are not covered, for example, drug transport, drug resistance, or cell cycle effects. Moreover, there is a heavy thread throughout of DNA as the preeminent anthracycline receptor, with relatively little mention of the evidence that other targets, such as cell membranes, may also be important in the biochemical mechanism. These limitations aside, the book is useful because most of the chapters are clearly written and much important and current information is presented. Anyone in the immediate field, or in the more general area of cancer chemotherapy, will find useful material here.

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**Advances in Neurology. Volume 27. Antiepileptic Drugs. Mechanisms of Action.** Edited by G. H. Glaser, J. K. Penry, and Dixon M. Woodbury. Raven Press, New York. 1980. iii + 728 pp. 18 × 26 cm. $69.00.

This massive volume is the end product of a sequential process initiated by the Epilepsy Advisory Committee of the National Institute of Neurological and Communicative Disorders and Stroke. The progression from subcommittee (1975) via organizing committee and closed workshop (1976) to an open symposium (1977) yielded (1980) this 400 000 word publication.

Many chapters were originally written in 1977. In some cases, minor revisions and additions were made in 1979; thus, certain recent developments are not adequately covered.

The nine introductory chapters on basic neurobiology (185 pages) are stimulating and will serve to update the background knowledge of researchers in this area. They are followed by three chapters on structure and activity relations in convulsant and anticonvulsant drugs, and a chapter on the mechanism of action of convulsant drugs. The latter enjoys the advantage of presenting definitive data and, thus, shines in comparison with the subsequent chapters.

The 26 chapters on anticonvulsant drugs are divided into 12 on the phenytoins, 8 on barbiturates, and 1 each on carbamazepine, oxazolidinediones, succinimides, benzodiazepines, carbonic anhydrase inhibitors, ketogenic diet, and valproate. This lack of balance may be a reflection of the total research effort in the last 40 years. It would be unfortunate if it, through the influence of this volume, determined the pattern of future research.

The mechanisms of action of anticonvulsant drugs remain largely unknown. Several of the chapters on phenytoin and barbiturates read like preliminary drafts of grant proposals. Some of them give the impression that solutions are tantalizingly close; the authors deserve to have their research funded. Let us hope that in 5 or 10 years time it will be possible to produce a book on the mechanisms of action of antiepileptic drugs that presents coherent explanations linking molecular events with changes in seizure thresholds.

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**Steroids and Peptides.** By Joseph B. Dence. Wiley-Interscience, New York. 1980. 15.5 × 23.5 cm. xii + 418 pp. $39.50.

It would be difficult in one 400-page volume to summarize organic chemistry, spectroscopy, steroids, and peptides—their historical and current literature, synthesis, physical properties, biosynthesis, metabolites, etc. The attempt is made in this book, but the result suffers from disorganization and a lack of focus on a single audience.

The book begins with a preface in which the author describes his objective—to help readers who are not "practicing, professional chemists" review organic chemistry: "to bridge the gap between no review whatsoever...and a full year's course in organic chemistry." Among his intended audience are "people in such various allied areas as pharmacology and *medicinal chemistry*."

Chapter 1, "Introduction to Steroids", contains a potpourri which would likely confuse this intended audience. The potpourri and lack of focus continues throughout the book. Chapter 1, for example, includes a broad spectrum of general information and outright trivia. Discussed are the crystal size of ergosterol, the finding that cholesterol is the "major sterol in many species of Rhodophyta," the Allen–Doisy test, diagrams of secretion of bile in humans, hormonal control of insect development, actions of ecdysone, cardenolides, conversion of *N*-nitroso-*o*-acetylsolasodine to pregnandienolone acetate, Diels hydrocarbon, the open envelope vs. half-chair conformation of ring D, the sequence rules, order of preference of suffixes in organic nomenclature, liquid crystals, the Beer–Lambert law, IR and UV spectroscopy, UV solvents, the "symmetrical doublet of medium intensity at 1380 $cm^{-1}$," electromagnetic radiation, specific rotation, physiologically active steroids, fat absorption of the intestine, biological activity of various androgens, and more.

A variety of synthetic reactions and schemes are discussed, embellished by an informal writing style—contrasting markedly with technical descriptions given as well. "We are not defeated...(because) the synthesis is not specific." "A bonus arising from the synthesis..." "Once again Adolf Butenandt comes into the picuture..." "Thallium, a next door neighbor of mercury..." "Polypeptides are hard nuts to crack..."

Diagrams and tables are well done, and bold face type is used to accentuate key words in the text. Numerous references through 1979 are given in footnotes throughout.

"Steroids and Peptides" is too wordy and not sufficiently detailed for chemists in the field. It also tries to cover too much in too disorganized a fashion for the "non-chemist" intended audience.

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**Life Sciences Research Report. Volume 17. Pain and Society.** Edited by H. W. Kosterlitz and L. Y. Terenius. Verlag Chemie International, Deerfield Beach, FL. 1980. 511 pp. 15.5 × 21 cm. $39.40.

This volume reports on a workshop held in Berlin between the 26th and 30th of November 1979. Chronic pain is a serious social problem, causing economic losses to society and demanding much medical care. However, pain is also a complex phenomenon whether considered as a normal sensation or as a symptom of somatic or mental illness. This book reviews pain and its consequences for society in a very wide sense, in terms of ethics and religion, moralithy, sociology, psychology, psychiatry, neurology, anatomy, pharmacology, and biochemistry. It should appeal to anyone working on pain, its basic and clinical aspects or management.

**Staff**

**Excerpta Medica International Congress Series. Number 495. Growth Hormone and Other Biologically Active Peptides.** Edited by A. Pecile and E. E. Muller. Excerpta Medica, Amsterdam. 1980. x + 282 pp. 17 × 24.5 cm. $53.75.

This volume presents the complete manuscripts of the invited speakers at the fourth International Symposium held in Milan, Sept 17–19, 1979. It is divided into six sections: "Methods of Hormonal Research, "Growth Hormone", "Prolactin and human chorionic somatomammotropin", "Somatomedin", "Hypophysial Peptides and Peptidergic Neurotransmitters", and "Clinical Aspects". There were also 70 short communications, but their texts are not included in this volume. It is hoped that this book will be of value to those who are directly concerned with experimental and clinical investigations on growth hormones and related active peptides.

**Staff**

**NIDA Research Monograph. Number 31. Marijuana Research Findings: 1980.** Edited by Robert C. Petersen. D.H.H.S. Supt. of Documents, U.S. Government Printing Office, Washington, D.C. ix + 225 pp. 15 × 23 cm. $5.00.

This monograph presents the interpretations and conclusions reached by an editorial board of eight scientists after reviewing the literature on marijuana through late 1979. The chapters include: "Marijuana and Health: 1980" (Robert C. Petersen), "Human Effects: An Overview" (Reese T. Jones), "Chemistry and Metabolism" (Carlton E. Turner), "Acute Effects of Marijuana on Human Memory and Cognition" (Douglas P. Ferraro), "Effects of Marijuana on Neuroendocrine Function" (Carol Grace Smith), "Effects of Marijuana on Reproduction and Development" (Jack Harclerode), "Effects of Cannabis in Combination with Alcohol and Other Drugs" (Albert J. Siemens), and, finally, "Therapeutic Aspects" (Sidney Cohen).

While the discussions are directed primarily to scientists, the style of the monograph is such that educators, health professionals, the legal profession, and others will find it useful in attempting to resolve problems involving the use and abuse of marijuana in their respective fields. For it must be admitted that "our knowledge of the acute and long term effects of marijuana is still limited" (William Pollin, Preface page vi).

**Staff**