

## BOOK REVIEWS

*The Alkaloids, Chemistry and Pharmacology, Volume 45.* Edited by GEOFFREY A. CORDELL and ARNOLD BROSSI. Academic Press, 525 B Street, Suite 1900, San Diego, CA 92101-4495. 1994. 280 pp. 15.5×22.5 cm. \$120.00. ISBN 0-12-4695450.

Another splendid addition to the series, with congratulations to the editors and authors in maintaining standards and giving us an opportunity to read concise, updated reviews on three areas of alkaloidal research, namely, toxins from spiders and wasps, the morphinoids, and alkaloids from club mosses (*Lycopodium* species).

The first chapter describes the polyamine toxins produced by spiders and wasps. Being the first chapter of its kind, it provides a comprehensive account of their structure, nomenclature, and synthesis. Sixty-eight toxins are reported up to late 1992; since all possess an aryl-acyl  $\alpha,\omega$ -diaminopolyazaalkane backbone, classification of these natural products is mostly based on the three insect families involved. This is followed by a section on synthesis where conventional peptide procedures apply. Structure determination is particularly well presented with emphasis on peptide analyses, modern nmr techniques, and ms analysis. This latter method is particularly useful as 1  $\mu$ l of toxin, "milked" from five spiders, can contain ten toxins varying in amount from 0.96  $\mu$ g to 33.02  $\mu$ g. The authors indicate that the pharmacology of these toxins will be reviewed in a further chapter in this series.

The Central Research Institute for Chemistry in Budapest has long been associated with academic and technical developments of morphinoids under the direction of the senior scientist and technocrat Cs. Szántay, and was an excellent choice to update the status of the chemistry of morphine alkaloids. Some twenty-five new alkaloids are described for the review period 1970-1993 with sections on occurrence and structure elucidation laid out attractively, but the synthetic section is a *tour de force*. I particularly liked the oxidative coupling story from the humble beginnings by Barton, using isotope dilution to measure a yield of 0.024% to, finally, one of 64% using  $\text{VOCl}_3$ . The section on transformation includes conversion of dihydro-thebainone and salutaridine into codeine and morphine and is followed by semi-synthetic methods for creating 14-hydroxymorphinans. Reactions of the principal members of the group are also discussed in detail. The penultimate section discusses the pharmacology of natural and synthetic morphinans—what makes them work and where. The answer still remains a mystery. Biogenetically the plant pathway is well understood and now it seems that in mammals (the rat) a similar pathway is followed.

Last but not least is the review on *Lycopodium* alkaloids covering the period 1985 to early 1993. Four skeletal arrangements are recognized and used to classify these alkaloids which are produced by what are called club mosses. Each of these sections includes structure determination and synthesis while a fifth covers miscellaneous alkaloids of diverse structures. Due to the difficulty of cultivating club mosses, biogenesis experiments are limited and so far only lysine and acetate are established as precursors.

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*Advanced Organic Chemistry of Nucleic Acids.* Edited by Z.A. SHABAROVA and A.A. BOGDANOV. VCH Publishers, Inc., 303 N.W. 12th Avenue, Deerfield Beach, FL 33442-1788. 1994. xvi + 594 pp. 17×24 cm. \$145.00. ISBN 3-527-29021-4.

This book was originally published in Russia in 1978 and, according to the authors, was intended to be a textbook for an advanced course in the chemistry of nucleic acids at Moscow State University. When a decision was made to reissue the book in English translation, a major revision and update of the material was undertaken. The revised book, translated into English and published in 1994, seems to contain some material up until about 1990, but the almost complete lack of primary references makes this assessment difficult.

Indeed, this is the greatest single failing of this book. The only place in which primary references are utilized is at the very end of the volume in a table describing the synthesis of various gene sequences. None of these references is more current than 1989 and most are much older. Throughout the rest of the book, the only references given are to other monographs or reviews, most of which are quite old.

There is a great deal of information presented in this volume. Although there are quite a number of typographical errors, mistakes, and unusual usages of the English language, this is not particularly surprising in a book of this magnitude presented in translation, and obscures the meaning of the text only infrequently. One example of difficult syntax leading to some confusion may be found on p. 141, where it is stated, "When such mixed anhydrides are employed, the hydroxyl groups of pentose are not protected because the side process of their phosphorylation both by nucleotide and diphenylphosphate is practically

at a standstill." Another example would be the use of the term "hydrophosphoryl" instead of the generally accepted H-phosphonate (Ch. 11.5.4).

Perhaps in an attempt to facilitate students' access to information as they proceed through this text, the authors have incorporated unnecessary and sometimes confusing redundancy. For example, Table 3.1, pp. 75 and 76, is not needed since the information presented is adequately described in the text. More importantly, material covered on p. 211 regarding periodate-mediated oxidation of the 2',3'-vicinal glycol of ribonucleotides is reiterated on pp. 444 and 445. This redundancy is not only unnecessary, it cannot be discovered using the Index. Looking under periodate oxidation in the Index, one finds reference only to p. 422, a section which has nothing to do with sugar oxidation. This brings out another substantial weakness in the book; namely, the Index is too sketchy to enable the reader to find material readily. A number of other examples of unnecessary redundancy may be found throughout the text.

This reviewer is somewhat critical of the choice of material in several places. For example, rather than simply dealing with the phosphate group in nucleic acids and their components, in Section 4.4 the authors spend some 17 pages dealing with general properties of simple alkyl phosphates. Similarly, while *pseudouridine* is certainly an interesting molecule, it seems quite unnecessary to spend four and a half pages discussing it in great detail. In other places, material is included which seems to be of questionable relevance to the topic, while the entire extremely important area of chemical synthesis of oligoribonucleotides is completely left out of the book.

In several places, notably pp. 342 and 384, the reviewer's ability to derive the desired information would have been greatly enhanced had the structures been presented in stereo representation. This is now a simple thing to accomplish using computer printouts and greatly facilitates visualization of information regarding complex three-dimensional structures.

In summary, this book has a wealth of information which would have had the potential to make it of value to professionals in the field. Much of it is too complex for graduate students interested in a broad perspective on nucleic acid chemistry. Unfortunately, the virtual complete lack of primary references to the literature renders the book of almost no value to the professional. This leaves this Herculean effort on the part of the authors and translator in an unfortunate limbo. Its unevenness, complexity, lack of an effective index, and extremely high price will preclude its use as a textbook in most settings; its lack of primary references will discourage investment by professionals in the field.

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