

## BOOK REVIEWS

*The Alkaloids*, DAVID R. DALTON, Department of Chemistry, Temple University. Marcel Dekker, Inc., 270 Madison Avenue, New York, NY 10016. 1979. x+789 pp. 18.5 x 26 cm. \$49.50.

The teaching of graduate or advanced undergraduate university courses on the chemistry of organic natural products always has been a difficult task and invariably has split the community of specialists into two camps, one wishing to be all-inclusive and hence, of necessity, dilute in any one subject matter and another going into great depths of selected topics and thus omitting many areas of the field. David Dalton's book represents the first attempt in written form to span the two extremes and to give a serious student of the field the opportunity of appreciating the breadth of the area as well as delving deeply into the fundamentals of individual components. Professor Dalton has accomplished this difficult task by presenting the field from a biogenetic, nearly biochemical point of view. He has done a masterful job in portraying a highly complex subject area from a sound pedagogic standpoint and in a lucid style.

The book is divided into chapters based on the amino acid derivation of the individual alkaloids. It goes deeply into the chemistry of intermediary metabolism, including the biosynthesis of the amino acid precursors of the alkaloids. It presents in shortened form the structure analysis of the natural bases, illustrates their biosynthesis or biogenesis and reveals their total synthesis. It is full of chemical tidbits, potential research ideas and, finally, potential questions for graduate student examinations. Its nearly 800 pages are loaded with a wealth of material which it is worthwhile to peruse at one's leisure.

As is common for most textbooks, the exposé is inundated with mistakes. They include those of grammar, sentence structure, and typography (page 7, last line: ". . . ortho the . . ." should read ". . . ortho to the . . ."; page 12, footnote, line 4 from the bottom: ". . . that not enough . . ." should read ". . . that not enough . . ."; page 27, line 4 from the bottom: ". . . synthesis of terpenes, . . ." should read ". . . synthesis of monoterpenes, . . ."; page 29, line 10 from the bottom: ". . . examine, compounds . . ." should read ". . . examine compounds . . ."; page 56, line 5 from the bottom: ". . . wirtten . . ." should read ". . . written . . ."; page 73, lines 3 and 5: ". . . pyran . . ." should read ". . . furan . . ."; page 90, line 7 from the bottom: ". . . retronicine . . ." should read ". . . retronecine . . ."; page 100, bottom line: ". . . 5-aminobutanal . . ." should read ". . . 5-aminopentanal . . ."; page 111, 3rd paragraph, line 1: ". . . liability . . ." should read ". . . lability . . ."; etc.), deal with problems concerning pedagogic lucidity (page 13: the use of numbers for carbons in a fragment as well as formulas is confusing and could have been avoided by the use of the following notation: e.g.  $C_1 + C_3 \rightarrow C_3 + C_3$ ; page 21, Eq. 2.11 and 2.12 and page 25, middle paragraph are too diffuse an introduction to fatty acid synthesis; page 24: aside from the inaccuracy of the forward OH group orientation in the conformational structure for compound 2.39 the change of conformational representation on going to compound 2.36 would be difficult for a student to understand; the same problem exists for the formation of 2.38 from its precursor; page 27: a methyl group is missing in formula 2.49; page 32: formula 2.61 should be numbered to make the adjacent text understandable; page 34: the picture 2.70 is confusing; page 36: "homologous analog" is an untenable term and a "reaction" cannot be a "homolog" (6-7 lines farther down the page); page 39: a hydroxy group is missing from the formula between 2.88 and 2.89; page 40: process 2.89 is probably not a displacement as shown, but a pyridoxal-mediated condensation; the preparation of 2.94 also may be more complicated than the displacement shown on page 40; page 70: OH should be OR in 5.3; page 84: "SCHEME 5.4" is missing; etc.), and involve theoretical interpretations (page 57: in view of known cobalt enzyme-catalyzed 1,2-migrations of alkyl and acyl groups the formulation of cyclopropanedione derivative intermediates is unnecessary; etc.).

Teachers, students and research workers in alkaloid chemistry will wish to have a copy of the Dalton book in their library.

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*The Biosynthesis of Aromatic Compounds* ULRICH WEISS, National Institutes of Health, and J. MICHAEL EDWARDS, The University of Connecticut. Wiley-Interscience, 605 Third Avenue, New York, NY 10016. 1980. viii+728 pp. 16 x 23.5 cm. \$29.50.

The authors of this monograph discuss in Part I the chemistry and biosynthesis of shikimic acid and the intermediates (chorismate, prephenate) leading from it to various natural products that contain an aromatic ring derived from the shikimate pathway in Nature. Their account is perhaps the most detailed review of this subject ever to have been published in monograph form. I enjoyed the wealth of historical information about the chemical and biochemical

developments pertaining to this topic. Parts 2 and 3 of the book cover the alternative routes by which Nature forms aromatic rings: from acetic acid and from mevalonic acid. The authors do not discuss these two topics in as much detail as in Part 1, but their account still provides considerable information.

The organization of the book around the theme of a structural feature, rather than by a more traditional biochemical pathway approach, is unusual. Nevertheless, it seems to be successful in focusing attention on the different ways Nature uses available primary metabolites to form the aromatic rings found in many secondary metabolites.

There are a few points which the authors raise that I do not agree with, for example, that there are any firmly proven cases of the biosynthesis of polyketides from two independent chains of  $C_2$  units. Also the direct reproduction method used to print the structural formulae has resulted in very non-uniform presentation. Structures often appear as if in bold-face for unexplained reasons.

The authors have done a fine job with their monograph overall. I recommend its reading to all specialists in the field of biosynthesis for good background information, even though the literature coverage is only through 1973 in many sections.

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*Rodd's Chemistry of Carbon Compounds, Volume IV, Part L*, edited by S. COFFEY, Elsevier Scientific Publishing Co., P. O. Box 211, Amsterdam, the Netherlands, and 52, Vanderbilt Avenue, New York, NY 10017. 1980. xviii+506 pp. 15 x 22.3 cm. \$126.75.

This sub-volume is the terminal volume of the revised second edition of "Rodd's Chemistry of Carbon Compounds", the first volume having been published in 1964. This comprehensive treatise is well respected and is an excellent source of information on all classes of organic compounds. The high price of this series probably will inhibit personal purchase of the complete set of this encyclopedic work. Volume IV, which deals with heterocyclic compounds, has 12 sub-volumes, reflecting the importance of this class of organic compound.

The volume under review has 4 chapters. The first by G. Shaw describes mainly purines with brief remarks on related compounds such as thiazolopyrimidines and pyrazolopyrimidines (119 pages). The synthesis and reactions of purines, alkylpurines, hydroxypurines, aminopurines and other functionalized purines are surveyed in great detail. The second chapter (119 pages) by D. S. Jones is concerned with nucleosides, nucleotides, and nucleic acids. This material is written for organic chemists and the author has made the subject understandable and interesting, a feature often lacking in a discussion of these compounds by biologists. The next chapter (53 pages) by K. Ohta, R. Wrigglesworth, and H. C. S. Wood describes pteridines, alloxazines, and flavins. The final chapter (164 pages) is an excellent comprehensive review of the biosynthesis of plant alkaloids and nitrogenous microbial metabolites by R. B. Herbert. Although literature coverage in this chapter is only claimed up to June 1976 (in the Preface) more recent references (1978) have been included in the discussion of strictosidine (isovincoside) which is the parent alkaloid of all the other more complex terpenoid indole alkaloids. Herbert has written a critical review pointing out inconsistencies in the extensive tracer work which has been carried out on this class of natural product in the last 30 years. The microbial products which are discussed include the  $\beta$ -lactam antibiotics and the mitomycins. Few typographical errors were detected (an occasional bond missing) and the subject index (48 pages) is excellent. I was pleased to find that the IUPAC system of nomenclature has been used rather than the one currently in vogue at Chemical Abstracts.

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