

# BOOK REVIEWS

## Indole and Derivatives

*The Chemistry of Indoles.* By Richard J. Sundberg. (Organic Chemistry: a Series of Monographs, Vol. 18.) Pp. xi+489. (Academic: London and New York, October 1970.) £11.45.

THE recent rapid growth in our knowledge of the chemistry of indoles has largely been a consequence of structural and synthetic investigations of indole alkaloids, many of which exhibit pronounced and varied pharmacological activity. These compounds include strychnine, reserpine, vinblastine and lysergic acid. Biosynthetic studies have also contributed to the excitement of this field, and have recently culminated in the recognition that most of the indole alkaloids are formed from tryptophan and a C<sub>10</sub> unit derived from two moles of mevalonate. Attempts to prepare the natural compounds and analogues likely to possess useful biological activity have led to a wealth of elegant new synthetic methods. The basic chemistry of the indole nucleus itself has, however, tended to become overshadowed, and it is to be hoped that the present book will help to redress the balance. It is the first comprehensive account of the chemistry of indole and its derivatives since the well known reviews of Sumpter and Miller (1954) and of Julian, Meyer and Printy (1962), and therefore provides a fairly thorough coverage of the literature of the past fifteen years or so.

The topics covered include electrophilic substitution reactions of indoles, reactions of substituents, synthesis of indoles, tryptamines and alkaloids (including a useful summary of their biosynthesis), oxidation, rearrangement and ring opening reactions, hydroxy, amino, and acyl-indoles, and other, biologically important, indole derivatives. Although much of the recent work has been synthetic in origin, the organization of the book is based largely on mechanistic considerations, and the author has concentrated on those reactions directly involving the indole ring.

The author could perhaps have adopted a more critical approach to some of the mechanistic speculations described, and there is little comparison

with other heterocyclic systems, or even with pyrrole. Insufficient emphasis is placed on the enamine-like character of indoles, or on the chemistry of 3-H indoles (indolenines), and the physostigmine group of alkaloids are not specifically discussed. Melanins are dismissed in one line (p. 438) and yet the formation and structure of these physiologically (and politically?) important indolic pigments are reasonably well understood. It is a pity that a short chapter summarizing recent spectroscopic work on simple indoles was not included (for example, ultraviolet, nuclear magnetic resonance and mass spectra).

Except for formula N25 on p. 81 (which should be 1,3-dimethylindole) and G11 on p. 192 (in which a methylene group is missing), the book appears to be free of misprints. Unfortunately, van Tamelen's name has been omitted from the general author index, although his papers are properly indexed at the end of the appropriate chapters. The equation,



on p. 30, concerning the alkylation of indoles with alcohols under strongly basic conditions, could be misleading as this reaction presumably involves hydride ion abstraction. The mechanism of the Fischer indole synthesis also deserves further comment, for the crucial step involving substitution of the benzene ring is now widely believed to be yet another example of an "electrocyclic reaction".

A mildly irritating feature of the book is that although all the formulae are numbered, a good many of the numbers are not mentioned specifically in the text, and reference back and forth is often frustrating, especially when the word "below" means on the next page, or the next page but one. There is a considerable amount of needless repetition in the structural formulae, and this can occur even in the same chapter (for example N33-37 on p. 82, and 162-67 on pp. 73-4; E111-115 on p. 267, and D17-19 on p. 239; E163-166 on p. 275, and D27-30 on p. 118). More cross-referencing could have obviated this type of duplication, and also emphasized, for example, the close relationships between the reactions

described in Chapter V and Chapter VI (parts A and B), with those in Chapter I.

These criticisms apart, however, there is no doubt that this book will prove an indispensable monograph for organic chemists working in the heterocyclic field, as well as for biochemists and pharmacologists. A. H. JACKSON

## Spectroradiometry

*Measurement of Spectral Irradiance Underwater.* By John E. Tyler and Raymond C. Smith. (Ocean Sciences, Vol. 1.) Pp. xii+103. (Gordon and Breach: London and New York, July 1970.) \$23.40; £9.75.

THIS book consists essentially of a detailed description of the spectroradiometer developed at the Scripps Institution of Oceanography and the spectral irradiance data produced by the instrument in a number of different locations. These data, although of a specialized nature, should be of considerable interest to anyone requiring an analytical approach to the type of problem which involves a study of the interaction of a complex optical detector with the spectral components of the ambient light field. Such problems could easily arise in the design of underwater photographic or television systems, in the study of human vision underwater and in studies of photosynthesis or chlorophyll production in natural waters.

The *in situ* spectroradiometer consists basically of two Ebert monochromators operated in tandem. Each monochromator has a spherical mirror to collimate the flux from the entrance slit on to a grating, and also to focus the dispersed flux into the exit slit. Light baffles are introduced to reduce the quantity of internally scattered light reaching the photomultiplier tube detector placed at the exit slit of the second monochromator.

The complete instrument has the very high resolution capability of between 5.3 nm and 5.9 nm over the range of wavelengths from 350 nm to 750 nm. It has been used to measure the light flux falling on a horizontal surface from either the whole upper