Alkaloids — Biochemistry, Ecology, and Medicinal Applications
M.F. Roberts and M. Wink (Eds.), Plenum Press, New York and London, 1998, 486 pp., $115

Among more than 150,000 natural products known today, over 12,000 are alkaloids, the vast majority of which have been obtained from plants. These figures demonstrate sufficiently why this class of natural products is of great importance to phytochemists. Phytochemistry is, however, not the main topic of the present book, and this is perhaps its greatest shortcoming. As indicated in the subtitle and specified in the preface, it is intended for advanced students and professional workers in agricultural, biological, and pharmaceutical sciences, natural product chemistry, biochemistry, and botany. But as it is frequently the case when many contributing authors (in the present case 18) from widely different fields of expertise are involved — the book being composed of collected short review articles, the structure is too unsystematic for a textbook and the coverage is not sufficiently comprehensive for a reference work. So it remains questionable if any of the intended readership will be fully satisfied. Anyway, the book is regarded by the editors as a sequel of Waller & Nowacki's *Alkaloid Biology and Metabolism in Plants* (1978), so I just have to judge if it is an update of current interest.

Following a short introduction, the book is divided into four parts, the first of which concerns historical and cultural perspectives. This part is composed of two chapters enumerating alkaloidal plants and fungi playing an important role in the history of mankind and alkaloids in arrow poisons. Both aspects are rather remote from the mainstream of alkaloid research, and they are likely to be those of greatest novelty to most readers. Given the limited space that is devoted to the different biogenetic groups of alkaloids in the introduction, the book would have gained substantially from a chapter giving examples of the major alkaloid classes not mentioned elsewhere (especially those of unusual biosynthetical origin and/or with unorthodox structures like, e.g., Lythraceae alkaloids, naphthylisoquinoline alkaloids, *Elaeocarpus* alkaloids, *Galbulimima* alkaloids, *Stemona* alkaloids, *Dendrobium* alkaloids, or *Daphniphyllum* alkaloids).

The second part of the book deals with biochemistry and related topics like chemotaxonomy, biotechnology, and plant physiology. Seven chapters give an overview on several aspects and recent developments in these fields of research. The chapter on chemical taxonomy by P.G. Waterman gives a perhaps too pessimistic perspective on the contributions of alkaloid phytochemistry to plant classification. In the light of the many cases in which phylogenetic hypotheses can be corroborated by common occurrence of specific alkaloid types, I cannot find chemical taxonomy to be "a frustrating business". Compared to the wide distribution and great structural diversity of alkaloids, surprisingly little is known on the enzymology and genetics of alkaloid biosynthesis — the genes of only 12 alkaloid biosynthetic enzymes have been isolated, only 24 have been expressed heterologously until 1995. This is adequately documented in two chapters but in the meanwhile of course many more genes have been identified and characterized. While biotechnological progress helped much in alkaloid research, it is still not an important factor in the industrial production of these secondary metabolites, as reviewed in four chapters.

Ecology is the realm of the third part, which is composed of six chapters. The first two chapters deal with chemo-ecology and modes of action of alkaloids, the latter being rather a pharmaceutical topic and somewhat alien in this part of the book (v.i.). Plant parasites and animal alkaloids are specialized exotics (albeit highly interesting ones) in alkaloid research, and it is debatable if it is justified to discuss them in three separate chapters while only one is left to plant allelopathy.

The fourth part is devoted to alkaloids in medicine. Alkaloid antibiotics (by R. Verpoorte) and the alkaloids applied in modern medicine are enumerated in two chapters. As the latter overlaps in circumscription and content with both the historical aspects in the first part and the chemo-ecological and pharmaceutical aspects in the third part of the book, these chapters should perhaps better have been placed in a continuous perspective, especially as they were all written or co-authored by M. Wink.

The book is completed by helpful subject-, substance-, and organism-indices.

In conclusion, it may be stated that all chapters convey sufficient information to be of interest to the advanced alkaloid researcher or bibliophile. Where a comprehensive treatise is necessary, the reader will likely require other sources.

J. Schlauer
Institute of Organic Chemistry, University of Würzburg, Am Hubland, 97074, Würzburg, Germany
E-mail address: schlauer@chemie.uni-wuerzburg.de

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