Secondary Plant Products, Edited by E. A. BELL & B. V. CHARLWOOD. (Encyclopedia of Plant Physiology, New Series, Vol. 8.) Springer-Verlag, Berlin–Heidelberg –New York: xvi + 674 pp., illustr., 23 x 16 x 3.5 cm, DM. 198 (approx. US$ 110.90), 1980.

Nearly all the original research on secondary plant products, and the syntheses and reviews of this work, is tragically reminiscent of trying to understand a Shakespearean play through analyses of its letter and phrase-word frequency, sequences, and phenotypic similarity. This survey and guide to the literature is no exception. What is even more tragic, and perhaps most relevant to the readers of *Environmental Conservation,* is that, even as scientific awareness grows in the new recruits and old hands in secondary plant-product chemistry—and it surely is growing even if not much reflected in the writing at hand—there is no longer a theatre, actors, and audience, to say nothing of the cultural milieu that generated the folk-tales which Shakespeare retells.

How can we inquire as to why a plant's secondary-compound profile has the pattern which it displays? As the habitat and its interactions extinguish around the plant, it is by and large the *raison d'être* of the secondary compounds that extinguishes. You can still study cell-wall formation, plastid development, hormone transport, and all those other 'primary' functions in the plant that are largely devoid of interactions with the biotic environment; but you cannot make sense of sugar ratios in *Cassia* endosperm, of cyanolipids in sapindaceous seeds, of betalains in Caryophyllales and *Amanita* mushrooms, and the non-glycosylation of uncommon amino-acids, in the absence of a deep inquiry into their function with respect to the biotic selection-pressures that generated these complex paragraphs, phrases, and play on words, which is like a Shakespearean piece in being unique to each plant population.

In a comparable manner, there is much of muscle anatomy that can be understood and described from elephants in zoos, but without understanding elephants in the field, their ivory, trunks, and replaceable molars, are biological nonsense. It is remarkable that we know enough of elephants to be able, even if the wild animals are extinguished, to make some pretty shrewd guesses about their parts. Not so for the majority of plants, and not at all likely to be so! This book now under review is just further documentation of how the master anthropomorphism of human drive for the harvest of material resources, is going to result in a thorough description of a few 'passages' from certain 'plays' while, in the meantime, the 'theatre' and all its appurtenances, including the Authors, is being consumed by mindless stomachs.

Now that I have said what no one wanted to hear, let me add that this book is a useful compendium, up through 1976–78, of the literature on the small-molecule secondary compounds. One can only hope that the wisdom of the series' editorial board will see fit to produce another volume dealing with lectins, protease inhibitors, polyphenols, resins, and other such megamolecules. Of course, then again there probably are quite enough reviews of these areas already, and the writers' time might be better spent on original research directed at doing something about the problem referred to in the previous paragraphs.

Scattered throughout this volume are numerous tips of icebergs—tips whose general importance will only become evident if the molecular plumbers either get themselves out to where the plants grow, or develop a really heavy interaction with the people who see a plant as a product of interactions rather than a thing unto itself. Why do many secondary compounds display molecular turnover? Why are nearly all secondary compounds, except the uncommon amino-acids and those in heartwood, by and large attached firmly to another inert (?) compound such as a sugar (answer: uncommon amino-acids exert their toxic effect by biochemical mimicry and can therefore be avoided by the owner through smart enzymes; heartwood is dead and therefore potent defense compounds can be deposited there without the cost of glycosylation and the danger which it presents through nutrient enrichment of the deposition site)?

Why are not merely a few standard masking glycosylating compounds used, rather than the enormous diversity which we encounter (answer: depends, just as in any system of self-protection, on the cost and availability of masking compounds, and the challenges that will be laid on them from the outside world)? Why is it that virtually every plant part has a large suite of secondary compounds, not one or a few? What happens when a seed-eating animal is confronted, for example, with a diet made up largely of a complex indigestible polysaccharide, a potent protease inhibitor, and a protein amino-acid of a type not normally found in the seed species that it eats?

What fraction of the traits that we see in a particular plant were generated by herbivore, pollinator, or other biotic challenges, of past eons (all plants are to some degree anachronisms) or of contemporary habitats only recently destroyed by human consumption—or even just by moving the plant into the greenhouse, with its internal plumbing design and economic constraints acting in consort with the external traits?

Whatever the answers to these and many other, similar questions that can be easily generated by reading your favourite chapter in this book, they won't be found in greenhouses or in more reviews of this type. Just studying the letters in this play is a luxury that we can ill afford.

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Planting for the Future: Forestry for Human Needs, by ERIC ECKHOLM. (Worldwatch Paper 26.) The Worldwatch Institute, 1776 Massachusetts Avenue NW, Washington, DC 20036, USA: 64 pp., 2 tables, 21.5 x 14 x 0.5 cm, paperbound, $2.00, 1979.

Surrounded by today's synthetic materials, it is all too easy to forget our dependence on trees and tree products. Forests, as Eric Eckholm points out at the beginning of this excellent short tract, 'are often evaluated by economists in terms of their ability to provide a dead product—wood; but for many of those residing in and around them, forests are a living, dynamic resource'.

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