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BOOK REVIEWS

Introduction to Ecological Biochemistry: by J. B. HARBORNE. Academic Press, London, 1977. xii + 244 pp. £7.00.

This is indeed a *tour de force*, well deserving the praise given to it by Miriam Rothschild in her foreword; which is in itself a fascinating account of the way in which the obvious can be overlooked for decades, and then hit the scientific scene with explosive effect (like Mendel and his peas). It was an article by G. Fraenkel in *Science* in 1959 drawing attention to the many intimate interrelations between plants and insects that triggered off this particular explosion, and it is the chemical basis of these interactions, and those between plants and other animals, between plants and plants, and between animals and animals which is the subject of the present book. Moreover, the nature of Man as an animal is taken for granted, and this is equally an account of the chemical world with which we ourselves are necessarily involved.

To myself, this book is full of reminiscence, and I make no excuse for reviewing it in this light. The Robinsons' work on anthocyanins was perhaps for me the starting-point, amplified by Lawrence and Scott-Moncrieff on the genetics of flower colours in the dahlia. This was followed by the systematic distribution of flavonoids, the 'privileged class' of plant constituents implicated in pollination and seed dispersal, in attractance and repellence, in defence mechanisms and physiological reactions in all departments of biological ecology. Jeffrey Harborne's own contributions in these areas are themselves sufficient to write a book about, but it is his integration of others' work in all these respects which is the important feature of the present one.

Some landmarks in this area I especially recall: work on bloat in ruminants at Jealott's Hill, leading deviously to the recognition of tricin as the flavone pigment in the marbled white butterfly (which feeds on grasses); isoflavones as the oestrogens in 'sub-clover', responsible for infertility in Australian sheep; the structure of ginkgetin, the first of the biflavones, of pisatin, the first of the phytoalexins, of vitexin, the first of the glycoflavones and of asperuloside, the first of the iridoids. And of course the tannins, then dismissed as unwanted debris of plant digestion, are now key substances in numerous interactions with other organisms.

A landmark also is Harborne's own work on the Old and New World gesneriads, an exciting contribution to the understanding of attractance to pollinators which forms one of the nine chapters in the book. Another chapter, dealing with the feeding preferences of vertebrates, including man, also makes fascinating reading. Even to the initiate it will come as a revelation what effect seemingly trivial differences in configuration can have on the taste and flavour of a molecule—the sweetness and bitterness of naringenin glycosides, for instance.

In fact every chapter possesses a fascination of its own, so that in sum the book can be recommended as reading value for its own sake as much as a source of reference which is unusually up-to-the-minute. Credit for this must go to the publishers for the speed with which it was produced.

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Plant Tissue Culture and its Bio-technological Application: edited by W. BARZ, E. REINHARD and M. H. ZENK. Springer, Berlin, 1977. 419 pp., 196 Figs., 60 Tables. DM 88.00 (approx £22).

This volume contains the proceedings of one of the two Symposium Sessions of the First International Congress on Medicinal Plant Research, held in the University of Munich in September 1976. The title is misleading, since the book in fact contains the most complete account ever produced of the biochemistry of secondary metabolism in plant tissue culture. Indeed, two thirds of the volume are devoted to this. The remaining one third deals with purely biological aspects of applied tissue culture, i.e. somatic hybridization, protoplast fusion, haploid production and plant regeneration. These are fashionable areas of research and have been covered before in other symposia proceedings.

To me, the outstanding chapter is that by Zenk and his co-workers describing their success in inducing suspension cultures of *Catharanthus roseus* to produce the two indole alkaloids serpentine and ajmalicine in good yield. It is a remarkable story. These authors show how it is possible by the adoption of a new analytical tool (radioimmunoassay), by the selection of variant strains and also by patience, persistence and brilliant management, to make cells in culture yield as much as 1.3% dry wt of alkaloid. This value exceeds that in the original plant by a factor of 1.5 and that of the average intact root by a factor of 5. It is also the highest yield of alkaloid ever recorded in callus or cell culture. This work brings the cell culture of medicinal plants from the realms of science fiction to those of fact.

The potentiality of tissue culture for the production of pharmaceutically important substances is also discussed in chapters by M. Tabata and M. Misawa and it is clear that a number of other secondary constituents can be formed in considerable amounts in appropriate cultures. Thus diosgenin is synthesized in *Dioscorea* in 1.5% yield and glycyrrhizin in *Glycyrrhiza* in 4% yield, while anthraquinones are formed in *Morinda* in 10% yield and naphthoquinones in *Lithospermum* in 12% amounts/dry wt.