Recent Developments in Flavor and Fragrance Chemistry

Proceedings of the 3rd International Haarmann & Reimer Symposium

Edited by Rudolf Hopp and Kenji Mori
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The Haarmann & Reimer Symposia one (1974) and two (1979) were well received by the flavor and fragrance community and many of us have looked forward to the third with positive anticipation. That symposium has now taken place (1992, Kyoto, Japan) and the papers have been published in the book currently under review. There is a wide selection of topics representing current research in the flavor, fragrance and biochemistry areas. There will be something to satisfy the varied interests of potential readers from the avid organic chemist to the casual historian of the industry.

A smorgasbord and a five-course gourmet dinner are two different things and serve two different functions. If one likens a textbook on this subject to the dinner, then this book is definitely a smorgasbord. This is not a criticism but a guide to potential readers as to what they are getting.

As in a smorgasbord with its separate groups of appetizers, salads and hot dishes, the reader is directed to three sub-groupings of literary delights. These are fragrance chemistry (often known as aroma chemistry), flavor chemistry, and biochemistry. The serious organic chemist, interested in synthetic routes to aroma chemicals and physical chemical data, will be drawn to the first section, as will the analyst interested in current methodology. Those more interested in products of thermal chemistry and heterocyclic cynthesis will find these in section two. The currently ubiquitous area of biochemistry and its application to aroma chemistry is covered in section three. Several interesting historical elements are scattered among all three sections.

In section one, Noyori reviews the use of metal complexes as asymmetric catalysts in the syntheses of terpenes and other fragrance materials. Hopp covers 120 years of research at Haarmann & Reimer beginning with the production of vanillin from the cambial sap of conifers, through exotic captive fragrance materials, and finally full circle to menthol and the production of vanillin by biotechnological methods. Pelzer illustrates the use of receptor and molecular structure/activity concepts to guide the syntheses of molecules having odors characteristic of lily of the valley flowers. Weyerstahl describes the use of modern techniques in the analyses of four essential oils of fragrance importance. In Mori's paper, the powerful combination of biochemistry and organic chemistry (bio-organic chemistry) is applied to the syntheses of chiral aroma chemicals. Surburg examines the volatile components of flowers and compares steam distillation and two popular headspace techniques for this type of study. The analyses of eleven Chinese essential oils are described by Kameoka. One goal of aroma chemical research, the syntheses of novel fragrance ingredients, is described by Harder as he relates the new materials of four different historical periods to the geneology of fragrance families.

In section two, the complexities of Maillard chemistry are discussed by Tressl. The importance of analysis to flavor chemistry is illustrated by Werkhoff in his review of meat volatiles and the heterocyclic chemicals found therein. The intricacies of thiamine degradation chemistry and its importance to meat flavor are examined thoroughly by Güntert. The results of analytical work on meat flavors are translated into new ingredients by synthesis as described by Bertram.

The current importance of biochemistry to flavors and fragrances is exemplified by Croteau's description of the biosynthesis of thujane-type monoterpenes in section three. Reed reviews the current knowledge of olfactory receptors and their interaction with odorants. Williams describes a group of glycosidically-bound flavorants and their enzyme-mediated release. Gatfield discusses the production of lactones and describes the different possible mechanisms for their enzymatic formation.

Of the sixteen papers in the symposium, eight are by Haarmann & Reimer researchers. A larger percentage of outside participants might have given more balance to the book. All of the authors are to be complimented on the clarity and detail of their presentations.

The book is physically very well done. In those chapters dealing with chemistry, the structures and reactions and spectral data are clearly presented with no obvious errors. Each chapter is well documented with references but the lack of an index is a disadvantage. On the other hand, a smorgasbord does not need a menu; visual inspection and consumption are sufficient to enjoy the meal. **Robert E. Erickson**