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PREFACE

The importance of carbohydrates in a wide cross-section of life-sustaining processes, and as constituents of biologically important molecules has been recognized for many years. The recent manifestation of interest in synthetic carbohydrate chemistry particularly from "non-carbohydrate" chemists can be ascribed in part to the trends in the evolution of such subdisciplines as organic, bio-organic, biological and medicinal chemistry. The realization that carbohydrates are vital components of many antibiotics and other chemotherapeutic agents has been a source of constant research activity in the quest for improved biological profiles. This has also fostered many important contributions in the site-selective modification of carbohydrates. The Barton deoxygenation reaction for example, was a timely response to an acute need to deoxygenate aminocyclitol antibiotics at specific sites, thus greatly improving their antibacterial spectrum. The recognition of cell-surface-associated carbohydrates and their interactions with proteins, including antibodies is the basis of a new molecular biology that will deepen our understanding of immunology and related sciences. As a result, many innovations in glycoside synthesis have come forth, and the synthesis of complex oligosaccharides is not an insurmountable feat any more. Concurrently, many chemical transformations have been accomplished with carbohydrates as substrates, particularly with the advent of powerful reagents being discovered in the mainstream of organic chemistry. Much of this effort has been concerned with the chemistry of the anomeric carbon, which presents a special challenge in stereocontrolled bond formation.

The recent resurgence of synthetic carbohydrate chemistry as an important subsection of organic, bio-organic and medicinal chemistry stems from the enormous potential of these stereochemically rich molecules in the synthesis of enantiomerically pure compounds. A general strategy has now emerged in which carbohydrates can be used as chiral starting materials in total synthesis, thus taking advantage of their inherent chirality, enantiomeric purity, stereochemical diversity, conformational bias, topology and unique stereoelectronic effects. Indeed the number and types of natural products that have been synthesized starting with carbohydrate precursors is impressive and unrivaled by any other group of naturally occurring source materials.

A parallel activity, which is undoubtedly an outgrowth of the many innovations in asymmetric synthesis has been the *de novo* synthesis of carbohydrates. In this regard, the

Sharpless asymmetric epoxidation has already left its stereochemical imprint in many laboratories.

The selection of articles featured in this Symposium-in-print is a modest and partial representation of some of the areas discussed above. I sincerely thank all the authors for having agreed to contribute to this volume and I apologize for the inevitable delay in publication.

The articles in this volume have been grouped according to areas with a common theme as follows:

a. Carbohydrate synthesis and transformations
b. Chemistry of the anomeric carbon
c. Oligosaccharide and oligonucleotide chemistry
d. Synthesis of optically active subunits from carbohydrates
e. Natural product synthesis
f. *De novo* synthesis of carbohydrates

In an undertaking such as this one, it was impossible to include contributions for many other laboratories where pioneering research in carbohydrate chemistry is being conducted. In spite of these limitations, I hope that the cross-section of areas discussed in this volume will be of interest, and that other important facets of carbohydrate chemistry will be featured in forthcoming Symposia-in-print. It is clear that the renaissance of the carbohydrate era will carry us well into the 21st century.

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