Introduction

The theme for this seventh ASTM-sponsored symposium on aquatic toxicology and hazard evaluation might be casually entitled "ecological relevance." Over the past several years there has been a pronounced shift in emphasis in aquatic toxicological research. From the areas of method development and data acquisition (e.g., information to support water quality criteria derivation) the emphasis has shifted to the fundamental question of whether generic water quality criteria and standards as well as permits for such things as the discharge of effluents and application of pesticides are providing a socially acceptable level of protection to aquatic communities. The transition can be seen in the chronicles of the previous ASTM symposia of this series [*ASTM STP 634* (1977), *STP 667* (1979), *STP 707* (1980), *STP 737* (1981), *STP 766* (1982), and *STP 802* (1983)].

The papers in this volume have been divided into five sections. The first addresses the area of foremost ASTM emphasis, methods development and validation. Results of single-species tests are presented; the greatest emphasis is on several species of daphnids (class Crustacea, order Cladocera), the main toxicological invertebrate test species in freshwater.

The remaining four sessions implicitly or explicitly address the theme of ecological relevance. There is much research interest concerning the potential toxicity of chemicals that are bound to particulates, whether natural particulates (e.g., detritus and clay), sewage sludge, or wastewaters. This area has traditionally received much less emphasis than aquatic hazard assessments of dissolved chemicals in the water column. The section on Evaluation of Chemicals and Chemical Wastes consists of papers addressing this area in terms of methods for assessing and interpreting toxicity and hazard evaluation data.

The third section, Assessing Impacts of Wastes on Aquatic Ecosystems, addresses the complex issue of whether effects of chemicals and chemical wastes, determined by laboratory testing, can be predicted or in fact occur in the environment. The issue is addressed from several vantage points, which will provide the reader a perspective on the issue's complexity.

Why chemicals, wastes, and sediments do or do not kill or undergo assimilation by aquatic life is the subject of the section on Bioavailability. The reader perplexed by the questions posed in the third section will here find insights concerning some of the mechanisms governing toxicity and assimilation. For example, failure to observe effects of metals in the natural environment may be due in part to the *in vivo* detoxification mechanism discussed by

Brown et al. The papers by Breteler and Saksa, Harrison, and O'Donnel et al demonstrate why certain metal compounds may never be assimilated by certain organisms under specific water quality conditions that control biological availability.

Much of the work in aquatic toxicology is driven by regulatory agency decisions; thus it is appropriate that the last section in this volume addresses water quality criteria. Some of the papers will likely influence future water quality criteria. The session was initially developed to debate the merits of the U.S. Environmental Protection Agency's paper "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Life and Its Uses." Stephan argued its merits, while Seegert et al and Wang took exceptions to certain of its aspects. Kimerle et al believe that the data base requirements of the criteria were much greater than necessary; tests with a few key fish, invertebrate, and algal species would, the authors feel, provide the same degree of protection. Papers by Hedtke and Arthur and by Jaworski and Mount address different aspects of water quality criteria rather than the Guidelines explicitly.

The symposium chairmen are especially indebted to Dr. Charles Coutant, Mr. Carlos Fetterolf, Dr. Charles Gibson, Dr. Alan Mearns, Dr. Del Nimmo, and Dr. Rich Purdy for convening sessions, and to Ms. Anne McKlindon, Ms. Kathy Greene, and the ASTM staff for organizing the symposium and supervising the publication of this volume.

Rick D. Cardwell

Envirosphere Company, Bellevue, Washington; symposium chairman and editor

Rich Purdy

3M Company, St. Paul, Minnesota; symposium chairman and editor

Rita Comotto Bahner

Association of Official Analytical Chemists, Washington, D.C.; symposium chairman and editor