Review of Meteorological Aspects of Acid Rain
(Volume 1 of the Acid Precipitation Series)

Edited by Chandrakant M. Bhumralkar. Butterworth Publishers, 80 Montvale Avenue, Stoneham, MA 02180. 264p. $32.50.

This book, from an American Chemical Society Symposium, purports to be a broad picture of meteorological aspects of acid rain. However, as is often the case at scientific meetings, some hard-to-categorize papers were apparently included in this session. Only the third through eighth papers (out of 13) match the meteorological emphasis of the volume title.

The first paper, an overview of acid rain, is a good review for the non-specialist, but does not deal with meteorological issues. It does present a good bibliography for those interested in multiple aspects of the issue. The review of the National Acid Deposition Assessment Program, the second paper, is becoming outdated as the program evolves.

The third chapter is an excellent overview of meteorological aspects of acid deposition, and would serve to highlight necessary research for the non-specialist. The fourth chapter presents several statistical aspects of wind and precipitation data used in the modeling of long-range transport and deposition. The next three papers discuss various aspects of long-range transport, all acknowledging difficulties in accurate trajectory calculation in three-dimensional precipitation systems. All of the papers illustrate that a large uncertainty exists in the calculation of any single trajectory in a precipitation situation, something all too often overlooked by those estimating pollutant sources for individual sample’s precipitation chemistry.

The study of wintertime precipitation chemistry in Georgia (chapter 8) begins to bridge the discipline gap between meteorological and atmospheric chemical processes. It also demonstrates how difficult it is to draw firm conclusions from limited data as to wet removal mechanisms because of the highly variable nature of meteorological processes. As the authors point out, long-term statistics are required.

Chapters 9 and 10 are topics in wet deposition monitoring and present interesting data from a remote area (American Samoa). The authors do not eliminate possible long-range transport of anthropogenic emissions of lead and sulfur, since both are elevated from what might be expected in a pristine area.

The last three papers cover catalysis of a quaternary NO, autoxidation, surface water chemistry modeling, and effects of aluminum on fish. They are of good quality, but they may be missed by those to whom they would be of the greatest interest, since they are not meteorological in nature.

Overall, this volume has serious limitations because of its lack of a unifying theme. It is not sufficiently detailed for the specialist, whether modeler or experimentalist.—JACK D. SHANNON, Argonne National Laboratory, Argonne, IL 60439.

Direct and Indirect Effects of Acidic Deposition on Vegetation

Edited by Rick A. Linthurst, Butterworth Publishers, 80 Montvale Avenue, Stoneham, MA 02180. 1984. 117p. $32.50.

As one volume in a series resulting from a symposium on acid precipitation held in conjunction with the American Chemical Society’s 1982 meeting, this book consists of eight papers (each a chapter) that deal with aspects of acid precipitation effects on vegetation. Other volumes in this series are concerned with the meteorological aspects, aquatic and geological effects, and economic assessments relating to acid precipitation.

The quantity and detail of information in each chapter is quite variable, as is the subject matter, which ranges from cellular injury to risk assessment. Some chapters such as the one on “Interaction with Insects and Microbes” are general overviews consisting mostly of speculation regarding acid precipitation’s negative effects, because there is a lack of available research results for any definitive evaluation. Other chapters are specific, detailed descriptions of the author’s research, such as the one describing injury to birch and beech leaves by simulated acid precipitation. All in all, the book is an interesting potpourri of topics relating to the direct and indirect effects of acid precipitation; however, one important area—that of effects on crop productivity—was entirely omitted. As was pointed out in the preface to the volume, “...considerable research has been completed on the effects of acidic deposition on crop plants,” and yet not one of the chapters evaluates the diversity of research done in this area.

Although conclusions at the end of many chapters are necessarily ambiguous, the introductions and discussions within the chapters would lead one to believe that acid precipitation is known to cause many serious environmental problems. There appears to be a tendency by many of the authors toward emphasizing the potential negative effects without substantiation from research results. In a field as politicized as this one, researchers must be cautious about leading the reader to accept hypotheses as fact when there are no directly supporting data. The preface by Linthurst, the editor of this volume, gives a cohesiveness to the book, contains valuable summary information, and provides the best insights into the complexity of this phenomenon.

The book chapters needn’t be read sequentially, since each author provides an independent evaluation of their topic; the index provides ready reference for location of specific subject matter. Although style and readability are generally good, it appears that the authors did not participate in a cooperative effort, as evidenced by the number of different terms used for acid precipitation (at least five are used) and by apparent contradictions. For example, a number of the authors refer to acid precipitation—induced erosion of the leaf cuticle, yet one chapter reports results of a study indicating that “...simulated acid precipitation is entering the leaf and causing damage after passing through rather than eroding the cuticle away.”

Because this book deals with a phenomenon that is relatively “young” in terms of research activity but is rapidly advancing, it suffers from the problem of being nearly obsolete, because of the more-than-two-year period between preparation of the material and final publication. The topics are all of current interest, particularly those dealing with forest growth; however, a number of advances have been made in many areas of this science, which provide a more current assessment of the impacts of acid precipitation on vegetation. Thus, the book would be of principal value to students and those interested in an introduction to the field of pollutant effects research and an overview of research topics relating to acid precipitation impacts. For a more thorough and up-to-date account of progress in this field, readers should utilize the references provided in each chapter and follow the recent progress made by the book’s authors, who are well-noted in this field.—PATRICIA M. IRVING, Environmental Effects Research Program, Environmental Research Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439.