Fertilizer Industry—Processes, Pollution Control and Energy Conservation


Utilizing primarily U.S. Environmental Protection Agency (EPA) reports on fertilizer production, the author wrote on a broad array of fertilizer subjects. Largely because of the extensive aspects of fertilizers included ranging from agronomic aspects to economics of the industry, the book most likely will be of greatest value to one seeking a brief overview of the subjects in the title.

Underlying this basic characteristic of the text is the fact that, of 14 references cited, 7 were EPA documents which generally are cursory in nature and typically are review-type documents without great depth. Current information from publications of the National Fertilizer Development Center, as well as from the chemical construction industry serving fertilizer producers, and from fertilizer producers themselves, is noticeably absent. Consequently, process engineers will find most methods inadequately described, whether for production, environmental control, or energy consumption. And, the agronomist will quickly note inadequacies of current fertilizer-use information, such as the reference to ammonium sulfate as a preferred nitrogen source for tobacco.

Technology described in the book is that of the pre-earlies seventies. Two notable developments around the mid-seventies not included are granulation processes for urea and the use of wet phosphate rock. The latter would have been a highly appropriate development to include in the section on energy use and conservation.

The reader seeking general information will benefit from the excellent illustrations. Very effective process flow diagrams are used throughout the book illustrating typical data on product balances and inputs such as energy. These diagrams and the clearly presented tabular data likely will be some of the most useful parts of the book.

Of the processes described, those for environmental controls are described most thoroughly. Extensive use of EPA reports may account for this. Air emissions and liquid effluents are discussed in detail for all major production processes, from ammonia synthesis to manufacturing mixed fertilizers. Solid wastes from phosphate production received only a brief reference. Emphasis clearly was on environmental discharges for which EPA had established regulatory limitations not later than 1975.

The very orderly organization of the book will facilitate quick location of special items of interest. Individual processes, whether for production, environmental control methods, or energy use analysis, are independent and the author's organization is logical—WILLIAM C. WHITE, The Fertilizer Institute, 1015-18th Street, N.W., Washington, D.C. 20036.

Cleaning our Environment—A Chemical Perspective


This is a revision of the 1969 edition with the same purpose, to describe the status of the chemistry of environmental improvement and to recommend measures to accelerate the development of this improvement. The book is directed at legislators, administrators, and teachers who must deal with environmental problems at "one or more steps removed from the pertinent science".

The report contains seven sections, each reviewing a topic of environmental interest, together with an introduction and a set of recommendations. The sections cover Analysis and Monitoring, Toxicology, Air, Water, Solid Wastes, Pesticides, and Radiation.

The greater part of the report, and particularly the introduction and recommendations, are written in a heavy handed style with an editorial policy to try to cover all possible questions. An example is the inclusion of a description of the way an integrating nephelometer works in a summary section. The result is a mass of detail in which the view of the wood is obscured not by the trees but in the description of the bark. No attempt is made to rank the research needs and to discard the trivial: to say that visibility should be investigated as an index of air pollution is to overstate the obvious.

The section on Chemical Analysis and Monitoring is a shopping list of methodologies. Those for air and water are little more than lists of possible problems: little attempt is made to discuss the general significance of each and the potentially most serious of all—the CO2 enrichment of the atmosphere—is only 1 page of the 70. No where in these three sections is any attempt made to review the basic question of large-scale sampling and data analysis that are one of our present major weaknesses in environmental studies.

The section on toxicity is informative. Here the report does discuss fundamental conceptual problems. The sections on pesticides and radiation are also informative and also well written, discussing clearly defined problems and what remedial measures can be taken. These chapters also contain much useful reference data.

The report is typical of many environmental texts that attempt to be comprehensive by the enumeration of detail. This fault is here compounded by the editorial problem inevitably met in a work basically written by a team of committees. The report does however contain an excellent set of bibliographies documenting the literature on each topic in detail. These, together with the two most successful chapters, justify the price as a reference work.—A. W. TAYLOR, Chief, Soil Nitrogen and Environmental Chemistry Laboratory, USDA, SEA-AR, Beltsville, MD 20705.

Chemical Concepts in Pollutant Behavior


The objective of this book is "to demonstrate how chemical concepts can be applied to define the behavior of chemicals in the environment and to present such an analysis at a level comprehensible to those who have had two years of college chemistry." It contains five chapters, the first four of which deal with the chemical and biological reactions of organic pollutants and the last with five case studies involving DDT, landfill leachate, freons and ozone, resin stripes and 2,4-D esters.

"Chemical Concepts in Organic Pollutant Behavior" would have been a better title because, with the exception of Hg and N, no inorganic pollutants are mentioned except very briefly in the analytical section. However, for the organic compounds the author has achieved his objective quite effectively. Chapter 1 includes the physical chemical principles that determine the tendency of the pollutant to be leached through the soil, evaporate, or be absorbed across a biological membrane. Chapter 2 covers mechanisms and rates of transformation of various types of organic molecules in the environment. In Chapter 3, the problem of bioaccumulation is analyzed and in Chapter 4, the weakest chapter, a brief and frequently inadequate discussion of analytical techniques and sampling problems is presented. Chapter 5 is devoted to the case studies which generally are quite effective in demonstrating the importance of the principles presented in the preceding chapters.

The author's limited acquaintance with the soil system is apparent in a few places. In his discussion of adsorption, he fails to point out that the hydroxy-oxide minerals can contribute significantly to surface charge and that the surface charge may be positive under acidic conditions. He also fails to point out the different effects on adsorption and leaching associated with saturated and unsaturated flow. However, these omissions do not detract significantly from the book as a whole.

The book is well written and easy to read and understand. In addition to a list of references cited, selected references for specific subject matter areas are given at the end of each of the first four chapters. The figures are generally well done and the tables contain a wealth of relevant data, possibly more than would be necessary for the intended audience. Students with no physical chemistry but with a background in organic should be able to understand the material and learn some physical chemistry in the process. It is a good for anyone with a reasonably good chemistry background who wants to obtain a general understanding of the factors that determine the fate of organic pollutants in the environment.—RICHARD B. COREY, Soil Science Department, University of Wisconsin, Madison, WI 53706.