BOOK REVIEWS

and alternative energy sources are compared. Parts 6 and 7 outline current issues of water and air pollution, with a separate chapter devoted to ozone depletion in the atmosphere. Finally, Part 8 deals with the interaction of modern urban society with the environment. In this section, environmental economics and law, urban planning, waste management, and problems caused by mineral extraction are introduced. This section concludes with a chapter that discusses the concepts of environmental ethics.

This book is an excellent and up-to-date overview of environmental topics, with abundant use of colorful diagrams, photographs, and graphs to illustrate key points. Because it is evidently intended as an introductory textbook and integrates many disciplines, it is not scientifically rigorous in any of them. This is probably necessary for a book of this scope, but I do find the minimal use of mathematics, physics, and chemistry to be troubling. For example, in Chapter 4, chemical reactions could have helped describe the carbon and silicate cycle. Again, while concepts of thermodynamics are discussed in Chapter 15, simple equations are not used to clarify quantitative concepts. In Chapter 22, acid rain chemistry could have benefitted from the inclusion of complete reactions describing nitrogen oxide and SO$_2$ chemistry. These are examples of cases where a little more scientific rigor might have been more economical (in terms of the length of description) and more lucid. As an aside, there are numerous technical errors (misprints?) in Chapter 4, most dealing with mislabeling of elements on the periodic table.

As a soil scientist, I must comment on some of the points made in Chapters 10 and 11, those chapters dealing specifically with agriculture. Agriculture is classified in terms of two systems, demand-based and resource-based. It is implied that demand-based agriculture uses chemical fertilizers and pesticides heavily, and does not employ conservation practices. Conversely, resource-based agriculture apparently uses no chemical fertilizers, and limited pesticides, employing no-till and conservation practices. It is argued that there has been a return to resource-based agriculture. This analysis is greatly oversimplified, and is presenting two extremes of reality. It is not true that, worldwide, farming is returning to the resource-based approach as described in this text—in fact, the trend is toward intensification, with greater inputs on less land area. The statement that farming “reduces the overall fertility of soils,” although consistent with the thinking of some ecologists, cannot be supported in general.

The debate between ecologists and agronomists revolves around the premise of ecologists, stated in this text, that “little of modern agriculture is sustainable.” Agronomists counter that the evidence does not support this premise, because crop yields have been increasing for a long period of time, albeit in response to greater inputs of fertilizers and pesticides. According to agronomists, a retreat to sustainable agriculture would mean that the increasing world population could not be fed. One conclusion is clear from this text: regardless of who chemicals, etc.) ignores physical-chemical constants and function. While it is true that new high-yield varieties of crops can only realize these yields with large fertilizer inputs, this text appears to argue that it would be possible to obtain similar productivity without such inputs. This contradicts the concepts of biogeochemical cycling presented earlier in the book. The example is given of the desert as one potential area that could be used to grow crops, but it is not pointed out that productivity of desert areas is necessarily low. Limited water translates directly to limited yield, and there is no hope that the desert could increase world food production without irrigation.

Another example of the something for nothing approach is presented in the suggestion that wild herbivores such as buffalo would do less damage on grazing land than domestic cattle. Again, this position seems to reflect a preference for conventional agriculture, rather than a reasoned argument. Compared at similar densities of animal units, domestic cattle would not be expected to do more damage than wild deer. It is further suggested that the use of soils and ponds to cleanse sewage is an “advanced treatment using the physical and biological environment as a filter.” Treatment, by recycling nutrients, would appear to be more sound. However, the authors should have pointed out that this could not be sustained because of the excess nutrients resulting from municipal sewages presently contain heavy-metal and organic toxins.

I offer these criticisms, not because of a belief that agricultural agricultural practices should not be changed, but because students must recognize that changes that fail to increase) short-term food production will not ameliorate the food shortage.

In summary, I recommend this book as a text for environmental science courses in which a survey of the many environmental issues is needed at a fairly nontechnical level. It should be comprehensible to students with limited mathematics, physics, and biology background. It incorporates general and specific environmental issues effectively, bringing up concepts to bear on real problems. For those of us responsible for the terminology and conceptual approach of this book, it is a very engaging introduction that encourages a broad view of earth processes.—M.B. McBRIEDE, Department of Soil, Crop and Atmospheric Sciences, Cornell University, Ithaca, NY 14853.

Ecotoxicology of Soil Organisms
