recreational use, and watershed management in our forests is relatively new, and yet the threat is very real. With our best figures, estimates of losses to agriculture are rather vague. More precise criteria are needed by which to reconcile benefits and costs of control measures. Emphasis is given to the need for air quality standards which will protect plants not only from obvious injury but also from the insidious, but perhaps more important, effects that result in growth suppression. Similar guidelines are required to assure that important animal products are not wasted during periods of emergency radioactivity. It is suggested that standards for some materials are too conservative and result in unnecessary waste.

Agriculture as a source of pollution is the principal theme in the section on water quality. Pesticides, fertilizers, salts, sediments, and processing wastes are the main pollutants discussed. It is of special interest that facts about the movement and the fate of pesticides in the environment relieve fears that were expressed a few years ago; also, there is little evidence that fertilizer nutrients are contaminating water supplies. However, the need to minimize the movement of these materials from the areas where they are applied is clear. An interesting approach to water renovation is suggested wherein waste waters are flooded over suitable forest or agronomic lands so that the soil and its associated flora act as a living filter. It is mentioned that the long-term effects of this treatment on chemical and physical attributes of the soil cannot yet be evaluated; the statement could well be modified to include the effect on soil-borne plant diseases.

Soil pollution from radionuclides, nitrate fertilizers, pesticides, and heavy metals is the subject of the third section. Evidence is presented for buildup of these materials in the soil, and their probable effects on plants and subsequent entry into the food chain are discussed. Pesticides probably will be used for some time to come, and there is an evident need for a careful evaluation of their use, relative persistence, and eventual fate as weighed against the benefits to be gained in crop protection; benefits may be worth some risk. Data on the role of soil flora in detoxifying contaminants show that this means does not offer a panacea. The "biological incinerator" has its limitations.

That agriculture has created one of its most pressing environmental problems in its own backyard is convincingly revealed in the section on disposal of human and animal wastes in rural areas. The daily voided wastes of poultry, cattle, and swine are ten times those of the human population in the United States. What was once a problem for the individual livestock producer is now a national problem requiring for adequate solution the best in research competence and support. There is general agreement that ultimate disposal of animal wastes, as well as domestic waste water, must be on the land and not in surface waters. Discussion of alternative methods for treating the highly variable wastes so that they are harmless to the land without adding to water and air pollution illustrates the complex nature of the problem.

The book should appeal to readers who are not conversant with all aspects of our environment and who are interested in obtaining a good overview of this one. There is ample information to meet that objective; not too detailed, but neither diluted to the point of being ineffective. Rather complete bibliographies and excellent author and subject indexes conclude the book.

ELLIS F. DARLEY
Statewide Air Pollution Research Center, University of California, Riverside

Game in an English Forest

The Roe Deer of Cranborne Chase. An Ecological Survey. RICHARD PRIOR. With an Appendix on the Diseases of Roe by A. McDiarmid. Oxford University Press, New York, 1968. xvi + 222 pp., illus. $7.

Roe deer (*Capreolus capreolus*) are the common small deer of Europe, occupying forests and woodlots in agricultural areas. They differ in interesting ways from most other deer species. For example, the male defends his territory, the female exhibits delayed implantation, and the breeding season occurs in midsummer rather than in autumn. Traditionally, these animals are hunted according to seasons and harvest rates set by landowners, who also select the hunters. No government game departments assume responsibility for the management of these animals; nor is there an annual hunting season when the woods are filled with red-clad hunters who pay for the support of state game departments, as in the United States. Because of this lack of any organized responsibility for wild animals, support for research and management of Europe's wild game has lagged far behind that of North America. Prior's book reflects this lag.

The book reminds one, in its outline and methods, of Fraser Darling's *A Herd of Red Deer*, published 31 years ago, which probably served as a model for Prior. Darling's book became a classic in animal behavior, but our knowledge and understanding of game animals have increased manyfold since then. In conducting his work Prior did not take advantage of this progress. Obviously no animals were marked to determine the movement patterns, social behavior, or other characteristics discussed in the book.

The author has filled the book with empirical statements about roe deer, unfortunately not well substantiated by his own data or thorough references. He barely comments on his methods of study, and in the chapter on techniques he is more concerned with descriptions of clothing, binoculars, and rifles than with procedures used in gathering data. This probably reflects the attitude held by many that the deerstalker and the gamekeeper are completely qualified authorities. From the strict viewpoint of a biologist, the book leaves much to be desired because of the omission of substantiated data.

Despite the technical deficiencies, the book does have much to offer anyone interested in deer. It is the best thing available in English and contains a wealth of information, however weak some of it may be. The work is based upon years of observation made by the author in a large English forest. Many of Prior's observations are new, and he presents various insights into deer biology with a description of the history of roe deer in England and of how man's activities have affected these animals—all of which should be of considerable interest to American readers. Some of the vocabulary challenges the reader's imagination; such words as "ride-sides," "hurdle," "fraying," and "hummel" cannot be found in the ordinary desk dictionary. The appendix contains a summary by A. McDiarmid of the parasites and diseases of roe deer.

For these reasons and because of the other interesting elements outlined above, the reviewer recommends Prior's book to anyone concerned with deer biology, especially behavior. It will serve as a useful reference.

VAGN FLYGER
Natural Resources Institute, University of Maryland, College Park