impossible without reducing the use of and pollution from fossil fuels is slowly gaining ground. A growing awareness of the connections among environmental problems led to the 1987 limited international agreement to reduce the production of ozone-depleting chlorinated fluorocarbons. A more comprehensive approach may provide a framework for taking a new look at the economic, social, and political linkages between energy, transportation, pollution, and development. Rather than searching for specific controls to reduce acid deposition, our goal may have to shift to reducing harmful emissions into the air because of their combined harmful effects on local, regional, and global environments. This will not make it any cheaper to control pollution, but it may obviate the fruitless confrontations between the Midwest and the Northeast, or Canada and the United States. And it may contribute to the general goal of sustainable development.

JURGEN SCHMANDT
Lyndon Baines Johnson School of Public Affairs, University of Texas, Austin, TX 78712

A Well-Studied Worm

The Nematode *Caenorhabditis elegans*. WILLIAM B. WOOD *et al.*, Eds. Cold Spring Harbor Laboratory, Cold Spring Harbor, NY, 1988. xvi, 667 pp., illus. $94. Cold Spring Harbor Monograph Series, vol. 17.

There is probably no organism that is growing in popularity among biologists at a faster rate than the free-living soil nematode *Caenorhabditis elegans*. Through the work of a relatively small number of pioneers, beginning largely with the efforts of Sydney Brenner and colleagues in the late '60s and early '70s, many elements of the organism's biology have been described completely. For example, a heroic effort has led to the complete description of its cell lineages. The entire neuroanatomy of the organism has been described through meticulous reconstruction of 20,000 electron micrographs of thin sections. The genetic map currently has about 700 identified genes, and an ordered collection of recombinant clones of the entire genome is just around the corner. This information provides an unparalleled resource for studying cell growth and differentiation at the single-cell level. Considering the opportunities this information provides, the appearance of this monograph could not be more timely.

The worm book, as it is called, serves many purposes. It is a comprehensive reference book, an introduction to the genetics and biology of *C. elegans*, and a source of many reviews of active research areas. As a reference for those in the field, and for helping outsiders to translate some of the *C. elegans* literature, the book is invaluable. The appendixes contain cell lineage charts, diagrams showing the positions of identified cells at various times during development, and a series of illustrations showing the positions of each neuron in the animal. For genetic topics, the book contains a wonderfully thorough appendix describing the phenotypes and map positions of most of the known genes and their alleles. A map of cloned genes is also included, but because of the progress in this area this section is rapidly becoming outdated.

The book provides for the first time an in-depth description of the basic biology of *C. elegans*. Chapters by White, Sulston, Kimble and Ward, Wood, and Riddle describe the anatomy and development of *C. elegans* in great detail, and a chapter by Emmons describes the structure and organization of the *C. elegans* genome. The newcomer may find the chapter "Cell lineage" (by Sulston) particularly interesting, as it includes a highly readable account of insights gleaned from the lineage. Much of "The nervous system" (by Chalfie and White) will also be of general interest, especially to those considering using *C. elegans* to study problems of neuronal cell specification, axon guidance, synaptic specificity, and behavior.

The opportunity for genetic analysis of complex biological processes is a major virtue of *C. elegans*, and this point is brought home repeatedly in the book. "Genetics" (by Herman) provides a description of how the basic tools of genetics are applied in *C. elegans*. In addition, many of the chapters describe the application of genetic analysis to problems in development, neurobiology, and cell biology. For example, "Genetics of cell lineage" (by Horvitz) demonstrates the power of using *C. elegans* genetics and laser microsurgery to define control circuits for pattern formation, developmental timing, and cell migration at the single-cell level. The chapter "Sexual dimorphism and sex determination" (by Hodgkin) describes elegant and detailed genetic experiments that define a complex pathway for sex determination. Additional chapters discuss genetic studies of muscle (Waterston) and the hardy alternative developmental form, the dauer larva (Riddle).

No volume can fulfill all readers' expectations, and this one has a few limitations. For example, a more detailed index would have made it much more useful to newcomers. Also, much valuable information about *C. elegans* transposable elements, DNA transformation, and gene structure has emerged since publication of the book and so is missing from it. However, the value of any monograph in a growing field can best be measured by whether it is still used regularly a few years after publication. By this criterion, the worm book will be a huge success. Every laboratory and most individuals working on *C. elegans* will want a copy. In addition, every library should have a copy, both to provide a rich source of information about *C. elegans* and to catalyze access to an increasingly important primary literature.

JASPER RINE
Department of Biochemistry, University of California, Berkeley, CA 94720
CYNTHIA KENYON
Department of Biochemistry and Biophysics, University of California, San Francisco, CA 94143

Freshwater Plants

Vegetation of Inland Waters. J. J. SYMOENS, Ed. Kluwer, Norwell, MA, 1988. xiv, 385 pp., illus. $140. Handbook of Vegetation Science, vol. 15/1.

As a compendium of recent and useful information on the macrophytic vegetation of lakes and rivers, this book partially fills a vacuum in the literature.

The book opens with two chapters primarily on the physical and chemical environment written from a limnological perspective by R. G. Wetzel and by H. L. Golterman *et al.* These are followed by an excellent review on photosynthesis as related to ecology in macrophytes, with bits of information on macrophyte and phytoplankton production, by M. Søndergaard. There are three descriptive chapters on macrophyte structure and phytosociology by C. Den Hartog and G. van der Velde, by E. P. H. Best, and by G. Wiegleb, and two chapters written from an ecosystem perspective, one by C. M. Breen *et al.* on the vegetation of swamp and flood plains and the other on the vegetation of running waters by F. H. Dawson.

The remaining three chapters seem out of place. One, a comprehensive case study of fenns in Holland by J. T. A. Verhoeven *et al.*, consisting largely of previously unpublished data that should have first appeared in the primary literature, is the only chapter that is not a review. The other two are largely or totally on algae but are not sufficient to give the microphytes their due in the book. The first, by J. M. Melack on aquatic plants in extreme environments, is well written and does touch on macrophytes in saline lakes. The other, by J. J. Symoens *et al.* on algal communities, focuses on the

classifications of algal assemblages, perhaps because of the impossibility of doing justice to an enormous algal literature in a single chapter.

With four chapters dealing with community structure or classification and none devoted specifically to production, energy flow, and the role of the macrophytic vegetation in the dynamics of the littoral, the book is unbalanced. It would also have benefitted from a chapter on sampling, with pointers on data analysis of the highly patchy macrophytic vegetation, a subject barely touched upon in the chapter by Golterman *et al.*, and a second one on the functioning of emergent macrophyte communities, whose ecology receives short shrift. Yet most of the chapters are good in their own right, and the book provides at least a partial synthesis of the literature on aquatic macrophytes. It does not do the same with respect to the microphytes, its broad title notwithstanding.

JACOB KALFF
Department of Biology, McGill University, Montreal H3A 1B1, Canada

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