sented and is an excellent guide for any beginner to the field. Craig describes in depth many of the objectives and problems associated with the thermal modeling of solar flare loops. The chapter by Birn and Schindler reviews quite successfully the current theoretical approach to pre-flare evolution of magnetic structures in the solar atmosphere.

Pneuman's chapter is a mixed blessing. He successfully reviews the present observations concerning post-flare loops. However, his presentation of theoretical models for the formation of these loops, though quite lucid, gives the impression that the issue is settled even though it is still highly controversial. Nevertheless the chapter is educational.

The chapter by Heyvaerts is a masterly review of many of the most complex flare problems. It is highly recommended. The only proviso is that many of Heyvaerts' comments represent his views of a subject about which agreement has not yet been reached.

In summary, the book can be useful for the experienced researcher in solar physics, but not as an introduction to the subject of solar flare theory.

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Microbiology

Contemporary Microbial Ecology. Proceedings of a symposium, Coventry, England, Sept. 1980. D. C. ELLWOOD, M. J. LATHAM, J. N. HEDGER, J. M. LYNCH, and J. H. SLATER, Eds. Academic Press, New York, 1980. xviii, 438 pp., illus. $41.

Modern microbiology has traditionally been a series of weakly connected disciplines. Less than ten years ago, for example, marine microbiologists had little contact with medical microbiologists. However, within the past decade a process of integration has begun. The term "microbial ecology" is used increasingly to describe the study of the comparative activities of microorganisms in a wide range of natural habitats. Concepts are discussed that are equally applicable to soils and salt marshes.

It is not surprising that the development of this active new field would spawn international symposiums. The first of these was held in New Zealand in 1977. The proceedings (*Microbial Ecology*, M. W. Loutit and J. A. R. Miles, Eds., Springer-Verlag, 1978) emphasized the individual disciplines contributing to microbial ecology. There were, for example, sections devoted to freshwater and marine ecosystems as well as to animal and plant microbiology.

Contemporary Microbial Ecology is a set of 19 papers based on keynote lectures given at the second international symposium. The conference marked an important turning point in the field. The first generation of microbial ecologists were primarily microbiologists trained in general microbiology or physiology. The new generation has a broader base. In addition to microbiology and biochemistry, they are well versed in genetics, population biology, and evolutionary theory.

The papers in this book reflect this new sophistication. There is a perceptive paper on microbial adaptation and selection by Slater and Godwin in which the complex kinetic, biochemical, and genetic factors controlling microbial community structure are discussed. Konings and Veldkamp consider the difficult subject of phenotypic responses of microbial cells to environmental change. In a fascinating paper on form and function in prokaryotes, Dow and Whittenbury attempt to define functional relationships between bacteria in biochemical and physiological terms.

The book also provides analyses of the extraordinarily wide range of survival strategies available to microorganisms. There are papers on aerial dispersal (Lacey and Gregory), symbiosis (Gooday and Doonan), and antagonism (Baker). A paper by Carlile explains the ecological implications of microbial chemotaxis and other sensory responses to environmental stimuli. Williams, in a paper entitled "On understanding predator-prey interactions," attempts to reconcile the approaches to predation of the microbiologist and the ecologist. His perceptive discussion points clearly to the dangers of interlacing microbiological and ecological theory, at least where predator-prey relationships are involved.

Specific habitats are treated in excellent papers on human pathogens (Jones), intestinal microorganisms (Bauchop), and the plant rhizosphere (Bowen). Kushner's paper on the survival strategies of bacteria living in extreme environments provides beautiful examples of the plasticity and resilience of microbial communities in response to stress. Apparently some bacteria can adapt biochemically to survive conditions, such as extreme heat, cold, saline environments, or pressure, that are lethal to most organisms. Recent work on interfaces as microbial habitats is reviewed by Marshall.

Extensive treatment is given to microbial transformations in soil and water. There are papers on nutrient and energy flow through soil (Paul and Voroney) and marine sediments (Jørgensen) as well as on bacterial energy conservation (Jones) and biodegradation of organic compounds (Bull).

My only criticism of this excellent book concerns its omissions. The vitality of the symposium reflects the input of young microbiologists, and the volume might have included more of the papers presented by younger, less established researchers.

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Paleobotanical Progress

Paleobotany, Paleoecology, and Evolution. Papers from a symposium, Ithaca, N.Y., Nov. 1979. KARL J. NIKLAS, Ed. Praeger, New York, 1981. In two volumes. Vol. 1, xxii, 298 pp., illus. $37.50. Vol. 2, 280 pp., illus. $36.

This is a timely book in that it brings together significant contributions from fields of evolutionary biology between which there has traditionally been too little interaction. Although the emphasis is on paleobotany and plant paleoecology, with chapters spanning geological time from the Precambrian to the Neogene, there are also contributions dealing with liverwort evolution by reference to comparative morphology and phytogeography, molecular genetics in the context of species durations, and biochemical evolution in early land plants. The book is published in honor of Harlan Banks, recently retired from Cornell University, who is remarkable not only for his outstanding work in paleobotany but also for his infectious enthusiasm and his generous and warm personality both as a teacher and as a colleague. In view of the dedication, it is perhaps surprising that there is not a greater representation of paleobotanists and others who have been among Banks's numerous students and collaborators. The book is an entirely American production in that all the authors are either American or have accomplished most of their scientific work in the United States. The reason for this is probably simply that the papers were presented first at a symposium held in the United States, but it seems a little unfortunate in view of Banks's international acclaim.

Paleobotany has had until recently and