Defects in Solids which is complete up until 1972. Jaros's first paper on deep levels was published in 1971, and his book is at its best on developments since 1976, the year in which his first Green's function-based calculation appeared. In style, however, it is quite different from Stoneham's treatise, being broad rather than both broad and deep. The reader who requires the depth will nonetheless find the important original papers are prominently mentioned by Jaros, and will be better prepared to study them because of the overall perspective afforded by this book. □

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Plant ecology from a physiological viewpoint

Peter D. Moore

Physiological Plant Ecology I: Responses to the Physical Environment. Edited by O.L. Lange *et al.* Pp.625. ISBN 0-387-10763-0/3-540-10765-0. (Springer-Verlag: 1982.) DM 239, $111.30.

THE NEW series of the *Encyclopedia of Plant Physiology* is to include four volumes devoted to physiological aspects of plant ecology. The objective of ecophysiology, according to the editors, is the explanation of processes in plant ecology in physiological terms. This has always been a concern of those plant physiologists with the vision to look beyond their own specialist spheres into the complex world of plant–plant and plant–environment interactions with which the field ecologist is concerned. It is now an expanding area of research in botany and these volumes aim to review its current state.

Part A (the first of the four volumes) deals with the reactions of plants to physical environmental factors; subsequent volumes will cover water relations and photosynthesis (Part B), the chemical environment and biotic interactions (Part C), with ecosystem studies, such as nutrient cycling and productivity, in Part D.

This first volume, with a few exceptions, is devoted to articles essentially dealing with light and temperature. The theme is introduced by an integrated account of the physics of radiation and the energy budgets of leaves and canopies, leading into a discussion of an essentially practical problem, that of defining and measuring photosynthetically active radiation. This is followed by a key chapter on the responses of plants to light intensity (or quantum flux density, to use the preferred term) by Olle Bjorkman, giving a lucid summary of the current state of sun-plant–shade-plant studies.

Responses to light which are not of a photosynthetic nature — seed germination, photomorphogenesis and photoperiodic phenomena — are becoming of increasing interest to ecologists and these processes are reviewed in some detail, together with the ecological implications of recent research, which are well presented and analysed. Potentially deleterious radiation, such as UV and ionizing radiation, is then discussed, followed by a chapter on that peculiar habitat (from a radiant energy point of view), the aquatic environment.

The emphasis of the book then changes from radiant to thermal energy. Berry and Raison's general account of plant response to temperature uses the rather unusual approach of beginning with productivity and working through to sub-cellular responses; the reason for this may lie in their thesis that adaptation to thermal regimes in plants consists of the protection of their internal metabolic systems. More detailed chapters follow concerning subcellular responses, microbial populations and the ecological significance of both high and low temperature. These latter contributions consider both the problems of extreme conditions and those associated with seasonal or diurnal fluctuations.

Appended somewhat incongruously to the radiant theme of the volume are three topics, wind, fire and the soil. There are some connections between the fire and wind chapters and their predecessors in respect of temperatures and energy exchange, and the body of pertinent literature; together with their intrinsic ecological interest, this certainly justifies their inclusion in this position.

The final contribution on the soil environment, however, seems very out of place. It is brief (20 pages) and concentrates upon mechanical composition and structure and their influence on water movement. It would have been sensible either to devote this chapter to soil temperature or to hold it over to the next volume, which will include plant–water relations.

The reviews presented here are full and detailed and yet retain a readability which will make them invaluable as a source of reference for those approaching an ecophysiological topic from other disciplines. The book, and hopefully the series, will for many years continue to be the first resort of those seeking a reliable literature review in this sphere, even though the subject itself is developing so rapidly. □

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No end in sight

P.C.W. Davies

Infinity and the Mind: Science and Philosophy of the Infinite. By Rudy Rucker. Pp.338. ISBN 0-7108-0461-X. (Harvester/Birkhäuser: 1982.) £12.95, $15.95.

ONE OF my earliest childhood memories is asking my father where outer space ends. "There is no end", he replied, then added cryptically, "If there was, what would lie beyond it?". I still remember that exquisite amalgam of awe, bafflement and disbelief at this first encounter with the infinite.

From time immemorial, man has been both scared and enchanted by infinity. Each culture has been forced to make its own peace with the idea. The Ancient Greeks revelled in its mystical significance, and the great classical philosophers grappled valiantly with paradox upon paradox. Those attributed to Zeno are best known. How, for example, can an arrow ever reach its target when it has to pass through an infinite number of places on its flight? The problem, for the classical philosophers, was their insistence that infinity can never actually be realized. It stands, like a forever unattainable goal, towards which processes can tend, but at which they can never arrive.

This classical tradition of *potential* infinity was only dispelled relatively recently, with the monumental work of the great nineteenth-century mathematicians, especially Georg Cantor. Cantor treated infinite sets as actual, completed, objects, and devised a collection of rules for manipulating infinite quantities. Thereafter, infinity became a respectable and rigorous mathematical concept, stripped of its paradoxical overtones.

It has not, however, lost its mystical appeal, and in this unusual book the author see-saws unpredictably between esoteric mathematical discourse and quasi-religious remarks. The early chapters introduce a number of circumstances where infinity is encountered in mathematics and physics. The discussion is reasonably elementary and straightforward. Later sections become much more advanced, and suddenly one finds oneself immersed in some pretty heavy technical analyses. Readers without a thorough mathematical grounding will get hopelessly out of their depth here, in spite of the liberal sprinkling of diagrams and the generous dimensions of the technical appendices.

One wonders, indeed, who the author is writing for. The intrinsic attraction of the subject, the author's fluent and convincing style, and his frequent allusion to the philosophical implications of the infinite, suggest that the book has a much wider potential readership than the technical level actually permits. Mystically-minded mathematicians and mathematically-minded mystics will feel very comfortable