

machian vestige is the enigmatic cosmological constant that may or may not link the atom and the cosmos.

Other promising prospects of unifying the physical universe have emerged in more recent years, and many cosmologists think that Mach's principle has joined the bulging rag-bag of discarded cosmological ideas. But, as Barbour shows, Mach's aspiration expresses an undying desire to discover a rational unity. In a supermachian form (as I have argued elsewhere), the principle reaches out to Whitehead's doctrine of internal relations, in which all identities are implicate within one another.

Is space absolute or relative? Is it real and independent of matter? My own guide is to consider the modern space-time continuum: it decomposes into space

and time peculiar to observers in relative motion; it relates to nothing external and hence is absolute; it is physically real and exists in its own right; and its dynamic curvatures propagate and are the source of further curvature (black holes may consist only of gravitational waves). When we appreciate the physical richness of the modern space-time continuum, the machian debate becomes of historical interest, and what remains are the fascinating supermachian hopes concerning the ultimate goal of cosmology. Presumably, some of this will be discussed by Barbour in his second volume. □

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Field tests

G. J. Jellis

Biological Control of Microbial Plant Pathogens. By R. Campbell. *Cambridge University Press: 1989. Pp. 218. Hbk £27.50, \$55; pbk £9.95, \$17.95.*

THE control of diseases on crop plants continues to be a pressing need throughout the world, whether to ensure a crop comes to fruition and produces an acceptable yield, or to produce a higher-quality product, free from blemishes and capable of being stored for long periods. For centuries, farmers (albeit often unconsciously) have been using methods for containing some of the worst ravages of disease — crop rotation, use of fertilizers and the selection of resistant varieties, for example. Such techniques can be grouped under the heading of biological control. R. J. Cook, one of the leading exponents of the subject, defines biological control as “the use of organisms, genes, or gene products to regulate a pathogen”. More commonly, however, the term is restricted to the narrower concept of manipulating microbial interactions with a pathogen or host to keep the inoculum density of the pathogen below an economic threshold, to retard or exclude infection or to induce host resistance. Although this concept is not new, it has come very much to the fore in the current ‘green’ climate as a non-chemical (seen by the layman as environment-friendly) way of controlling plant diseases.

With such considerable interest, and the consequent increase in research funding, Campbell's book, designed for undergraduates and graduate students, is a welcome addition to the literature. It provides a good introduction to the subject, developing the theme in a manner both interesting and easy to follow. After

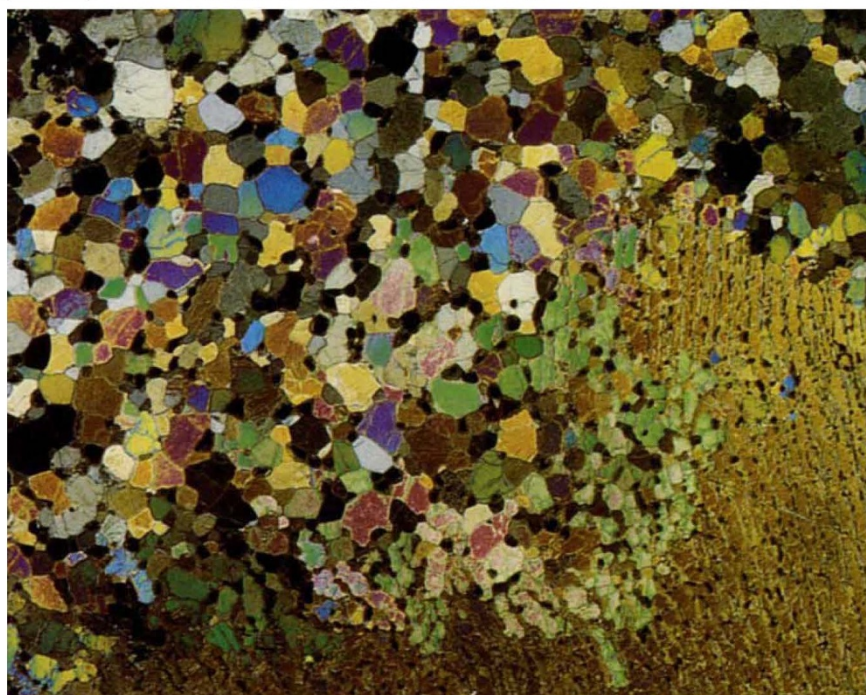
a few hours' pleasant reading, the average undergraduate reader would have a sound grasp of the concepts and a broad view of the state of the science. The book is also designed so that those who wish to learn about a particular aspect of biological control can do so, with the aid of a comprehensive subject index, expanded indices of pathogens and antagonists, a reference list and a glossary of terms.

As a plant pathologist with a particular interest in disease control but not a specialist in biological control in its narrow sense, I was delighted to find that,

throughout the book, Campbell considers biological control within the general framework of control strategies. But he does not avoid the problems, as well as the potential, of the approach. After describing some of the exciting experiments that have been done on leaf, stem, root, fruit and flower diseases, he brings the reader back down to earth in his concluding remarks to each chapter. Although biological control has much to offer, in general, the breakthrough from the closed system to the field has yet to come. Biological control also has its risks — one only has to think about some past mistakes in insect control such as the unsuccessful introduction of cane toads in Australia to curb the sugar-cane beetle. Both toad and beetle are now problems in Queensland.

Another appealing feature is the way Campbell describes the development of a product, from the basic science required to understand the mechanisms of biological control through to testing and patenting. This form of presentation should stimulate the next generation of plant pathologists to think of fresh approaches and, perhaps more immediately important, to find ways of implementing, in the field, control measures already developed in the laboratory. □

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Igneous art — volcanic rocks frequently contain inclusions (xenoliths) of different origin and composition. The photograph shows the complex metamorphosed structure of a mantle xenolith from Lake Bullenmerri in eastern Australia, as viewed through crossed-polarizing filters. The lamellar golden region is augite, a mineral of the clinopyroxene group, which has recrystallized elsewhere as a mosaic of polygonal augite, bronzite and garnet (black). The picture is reproduced from *Intraplate Volcanism in Eastern Australia and New Zealand*, by R.W. Johnson, published by Cambridge University Press, price £50, \$85.