

BOOK REVIEWS

Abusing science: The case against creationism by Philip Kitcher. The MIT Press, Cambridge, Massachusetts, 1982, pp. x + 213, \$ 17.25.

Orthodox Christianity claims that the earth is the centre of the universe and man has been specially created by God. During the last three centuries humanity suffered two great blows to its self-esteem. The first came when Copernicus declared that the earth is not the centre of the universe and Galileo concluded that the universe is vastly larger than had hitherto been thought. The second was Darwin's proposal that living forms have evolved from common ancestors and that humans are descendants of animals who also gave rise to the contemporary apes. In Galileo's time the Church was all powerful, and Galileo had to recant his 'heresy', though in recent times even the Church has admitted that Galileo was right. In 1860 Bishop Wilberforce tried his best to cast aspersions on Darwin and his evolutionary theory, but Thomas Henry Huxley, 'Darwin's bulldog' was able to demolish the bishop with a timely piece of repartee.

For a hundred years after Huxley's victory there was no active crusade against Darwinism. But in recent years, a political alliance has been forged in U.S.A. between 'the self-appointed champions of virtue and religion'—the Moral Majority—and a group of believers in the literal truth of the Bible. These extreme fundamentalists, who call themselves Scientific Creationists and who have obtained doctorates in various scientific fields, have founded the Institute for Creation Research. They like to 'reform' the teaching of high school science and have distributed a large mass of literature, arguing that evolutionary theory suffers from crucial deficiencies and that Creation 'Science', a doctrine compatible with the literal truth of Genesis, is far better supported by evidence.

In this book, the author who is Associate Professor of Philosophy at the University of Vermont and one time Associate in Zoology at the Harvard University's Museum of Comparative Zoology makes a brilliant and scholarly analysis of the creation-evolution controversy. He has thoroughly refuted the fallacious arguments of creation 'scientists' and shown how evolutionary theory has evidence from different sources and sciences to fully support it. The language the author has used in the book is

simple and can be understood even by non-specialists. The book should be read by all scientists who value reasoning as an approach to solving scientific problems.

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Moulds—their isolation, cultivation and identification by David Malloch. University of Toronto Press, Toronto, 1981, pp. 97, \$ 13.95.

In his Preface the author says there is need for 'a simple text demonstrating what moulds are and how they are grown and identified, and indicating which books would be useful for further work.' He also adds: what is needed is 'a simple means of identifying the common moulds that make up 90% or more of those encountered by the average student'. Apart from the description of methods of isolation and cultivation of moulds, the cream of the book consists of Keys to what the author considers 60 common genera of moulds together with very brief descriptions and line drawings of these. In Chapter II moulds are interpreted to include the Oomycetes, Zygomycetes, Ascomycetes, Basidiomycetes and anamorphs. In the Oomycetes *Saprolegnia* and *Pythium* are illustrated in Chapter II and yet no water mould is included in the 60 common genera. Indeed, the choice of the 60 genera is somewhat arbitrary. In the Keys given, these are separated into 5 groups in descending order of their commonness, which is again somewhat arbitrary. It would perhaps have been much better to treat genera which are closely similar or related together in order to highlight their differences. The author makes the point that the text is simple by intention and should be useful to those unfamiliar with the study of moulds. This is a very laudable objective which the author has succeeded in achieving in the chapters dealing with culturing and isolation. Unfortunately, however, this is not true of some of the other chapters. For example, Chapter II would have been strengthened by inclusion of more information about fungus morphology. Descriptions and illustrations of different kinds of zoospores, illustrations of the basidia typical of Gasteromycetes along with basidial types already illustrated, and illustration of bitunicate asci along with asci already illustrated would not only be considered useful but necessary. These are only cited as examples. Over-simplification has no merit when the primary objective of instruction is lost thereby. In Chapter II again, modes of conidiogenesis are described in some detail but yet there is no definition of the phialide or annellide, both terms used in the descriptions and the Keys. Being a book intended for the uninitiated, a glossary of these and other terms would have been useful.

There is a chapter dealing with natural occurrence of moulds highlighting some of the commonest habitats and substrates of moulds, though reference is again almost

entirely to terrestrial moulds. Methods of cultivation are described clearly together with details of composition of various kinds of media, their preparation, sterilization, etc. Methods are then described for isolating moulds; these include direct isolation techniques and special selective methods. The chapters on contamination and microscopy are direct and simple. The descriptions and illustrations of genera are arranged in alphabetical order together with listing of holomorph names and select references to taxonomic literature. The illustrations (not to scale) are by and large very satisfactory and bring out the essential diagnostic features clearly. A selected list of relevant and very useful literature under References and an Index are provided. There are a few minor but clumsy statements such as for example 'most parasitic fungi do not produce great numbers of spores' (page 14). The appellation 'characteristic swellings' for clamp connections (page 8) is curious.

These criticisms are offered in the hope that a future revision will give place to a considerably improved version of the present work, particularly in view of the great competence of the author as a taxonomic mycologist. The present book is well printed, and neatly got up.

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Alpine flora of Kashmir Himalaya by U. Dhar and P. Kachroo. Scientific Publishers, Jodhpur, India, 1983, Pp. vii + 263, Rs. 200/\$ 45.

The alpine region of Kashmir is known for its scenic beauty with peaks mantled with perennial snows plunging into lake-studded valleys carpeted with ravishing seasonal spring flowers. The frontispiece of the Thajawas Valley, the only colour reproduction in the book, promises the reader a treat.

The book is more than a mere 'Flora'. It attempts a study of the vegetation of this lofty region by presenting it in a setting of the geology and climate of the mountains. Further the present-day alpine plants of Kashmir are related to their counterparts in similar habitats in the northern hemisphere. The extant vegetation of today is linked to the extinct vegetation of a region that was uplifted from the depths of the Tethys to the heights of the Zaskar and Karakoram. The final chapter gives an annotated enumeration of plants distributed in 53 families. There are keys to the genera in each family.

This promising work could have been produced in a more appealing manner. The chapter on geology and climate suffers because of the juxtaposition of different views. A straightforward and lucid write-up in the authors' own words would have improved

the text. The interesting data in the distribution charts (figs. 5-21) is not easy to decipher. A fold out with symbols (fig. 4) and an appropriate type face may have improved the production.

The 91 distribution maps could have been excellent means to visualise the geographic extent of the taxa. However, the badly stippled altitudinal zones obscure the superimposed data.

The seven half-tone plates on Himalayan plants have lost much in reproduction. The haunting beauty of the land and its plants is scarcely reflected in the grey tones of these plates.

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Basic techniques in ecological farming : The maintenance of soil fertility edited by Stuart Hill and Pierre Ott. Birkhauser Verlag, P.O. Box 34, CH-4010 Basel, Switzerland, 1982, pp. 365, S. Fr. 28.

The main theme of the book is organic agriculture. The book has two parts - one dealing with basic techniques in ecological farming and the second with the maintenance of soil fertility which formed the theme of the conferences organised by IFOAM (International Federation of Organic Agriculture Movement) in 1978 and 1980.

Besides a few introductory papers, the first part has papers on subjects such as agriculture, silviculture, role of legumes, herbicides, organic fertilizers, animal manures, and discussion of energy analysis of agro system in developed countries and farm planning and farmers' training programs in tropical ecological agriculture.

Most of the authors concluded that organic agriculture is the alternative to the high input intensive agriculture for sustaining soil fertility and environmental problems. The limitations of the high input based technology particularly for the tropics is emphasised. Importance of trees, legumes, green manuring, minimum tillage with minimum input of fertilizers is indicated. Some of the authors have taken a more balanced view while others have adopted an extremist and faddist posture.

Many papers have emphasised the need for living in cooperation with nature considering trees as important part of the system for sustained crop production in humid and Savannah areas of tropics. Some of the papers have focussed attention on the role of the society and community in conserving ecosystem. Unfortunately none of the papers

has brought out clearly the economic implications and comparative benefits of the organic agriculture. It is recognised that many of the advantages are obtained after long time and with continued efforts. There is no evidence presented that the humanity can meet its food needs without modest and rational use of fertilizers, pesticides and herbicides. There is no doubt that excessive and imbalanced use of chemical is harmful but a balanced use is necessary. There is no case for taking a partisan and extremist stance.

Analysis of the experience in Rwanda also clearly establishes the value of minimum purchased input use strategy for increasing production in the legume-based agro system.

The second part which deals with the maintenance of soil fertility includes most of the experiences from developed countries of temperate zones except one paper on green manuring in the tropics. The role of green manuring is uncontested, but for reestablishment and increase of productivity of green manure crops especially in highly leached, low base and high aluminium soils of humid tropics without the use of lime and phosphates has not been brought in proper perspective.

The authors of papers of both the conferences have done a good job in focussing attention on the role of trees, green manuring, organic manuring and minimum tillage and environmental hazards associated with exploitive agriculture, based entirely on the use of chemicals and machinery.

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The biological chemistry of iron (NATO Advanced Institute Series) edited by H. B. Dunford, D. Dolphin, K. N. Raymond and L. Sieker. D. Riedel Publishing Co., P.O. Box 17, 3300 AA Dordrecht, Holland, 1982, D. Fl. 145.

This volume summarizes the proceedings of a NATO Advanced Study Institute on the Co-ordination Chemistry of Iron in Proteins and Enzymes held in 1981. The explosive growth of bioinorganic chemistry in the last few years is exemplified by this book, which devotes almost 500 pages to various aspects of iron chemistry in biological systems. If one considers the variety of metal ions involved in biological processes the prospects for the new discipline are certainly promising. This book is extremely well organized—a marked contrast to the usual multiauthor proceedings volumes. The first section (40 pages) provides a particularly good introduction to iron chemistry with emphasis on reaction mechanisms (Wilkins) and redox chemistry (Reed).

The remaining six sections of this volume deal with iron metabolism, cytochromes, oxygen-carrier proteins, iron-sulfur clusters, heme models and heme enzymes. The average length of each contribution (15 pages) is barely sufficient to permit the indivi-

dual authors to present their material in readable form. In general the contributions provide reasonably extensive references to background literature to assist readers who are not specialists in this area. The selection of topics does justice to the diverse role of iron in biochemistry. As is inevitable in a multiauthor volume, there is some unevenness in the level of treatment and presentation of topics. While some articles provide a fairly general overview, others are somewhat narrowly focussed. The promise of the introductory section is not fully maintained in the rest of the volume.

There are some very interesting contributions and an undoubtedly prejudiced selection would include the discussion on side ephores (Raymond and Tufano), hemes of hydro-porphyrins (Chang), cytochrome P-450 (Ullrich *et al*), beef liver catalase structure (Murthy *et al*) and on hydrogenases in sulfate reducing and methane forming bacteria (Le Gall and Peck). Singling out these articles only reflects the interests of the reviewer. There is little doubt that researchers in the area of inorganic biochemistry will find this collection useful. The only criticism I have is that a more focussed collection with fewer (but more extensive) articles would have been more valuable to non-specialist readers, who are most certainly likely to outnumber those who are fully initiated into the complexity of the biological chemistry of iron.

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