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THE ASSESSMENT OF ENVIRONMENTAL PROBLEMS
Edited by: Gordon Conway

This book examines the difficulties encountered by scientists, lawyers, administrators, politicians and the public in assessing the nature of environmental problems. Contents include: Acid precipitation; Lead in the environment; Agricultural pollution; Co-ordinating economic and ecological goals; The co-ordination of assessment; Science, legislation and the courts; Public perceptions and international influences; Assessment in the political context.

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ISBN 0 950 774 5 6
£7.50 paperback (incl. p&h)
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Antisymmetry focuses the attention

Michael Berry

Antisymmetry

Sisters in symmetry

Symmetry: Unifying Human Understanding
edited by István Hargittai, Pergamon, pp 1064, £76-50

Michael Berry

Antisymmetry can simplify mathematical reasoning. There is an introduction by Kapitza to the fractal geometry of hierarchical structures; this is clear enough but contains nothing that Mandelbrot, who says it better, has not already published elsewhere. The discussion by Blackmore of the mathematics of chaos is too abstract and too brief to be of use to the newcomer, and is in any case out of place because it does not deal with symmetry in any sense. A thorough and broad treatment of the symmetry of biomolecules by Van Steveninck is particularly valuable because it emphasizes the importance of regular structures occurring at different levels of organisation. The mysterious fact that molecules can occur in left- and right-handed forms (chirality) is discussed in a geometrical way by Sokolov, but the way in which handed molecules originated is not considered at all.

Two articles about Moiré patterns complement each other nicely. Ciger deals with the mathematics, showing how to construct sets of parallel curves which superpose to give the contour lines of any smooth fraction of two variables. Wittich emphasizes the perceptually disorientating effects (not easy to explain) of Moiré, especially moving ones, and shows many of his beautiful Moiré art objects.

Inevitably, several articles deal with the symmetries of Moorish and other patterns such as wall tilings and textiles. The outstanding paper here is by Grünbaum, Grünbaum and Shephard. They show that, contrary to the claim often made or implied, the Moorish artists did not exploit all the possible symmetries of plane patterns. For example, they employed only 13 of the possible 17 "wallpaper groups" in which colour is ignored; when colour is taken into account, the number of patterns is much greater. Washburn points out the strange fact that pre-Columbian textiles are often coloured in such a way which is incompatible with their underlying structural symmetry. I notice a related phenomenon in the overhead projector transparencies that I prepare to illustrate lectures: different-coloured pens are used purely decoratively, in ways quite unrelated to the content.

A carefully argued paper by Johnson makes the claim that in Paradise Lost Milton employs the Fibonacci approximations 5/8 and 8/13 to the golden section, as a mathematical symbol of theodicy (explaining the ways of God to man). He is well aware of the dangers of such interpretations: "In literary scholarship, the discovery of a symmetrical pattern is not in itself parthenologically useful; for the sorts of patterns one encounters are not mathematically complicated and, without a clear relationship to the verbal content of a work, are either of no value to the reader or give the impression of having been arbitrarily or even irresponsibly imposed. In these matters, then, the realization of poetical purposes in mathematical symmetry is our aim..." These wise remarks are worth keeping in mind while reading some of the other articles about symmetry in the arts, such as the one by Pavlovic and Trinajstic, which solemnly tells us that "...the symmetry or asymmetry characteristics of letters apparently has little effect on the perception of the document".

Such nonsense apart (and there is much of it, and worse), this is a stimulating collection of the most varied and many useful pieces of references, well produced and abundantly illustrated.