

Mineralogy for everyman?

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The Encyclopedia of Mineralogy. Encyclopedia of Earth Sciences, Vol. IVB. Edited by Keith Frye. Pp.794. ISBN 0-87933-184-4. (Hutchinson Ross: 1982.) \$95, £62.80.

WHAT does the non-mineralogist want to know about mineralogy? This encyclopaedia sets out to provide the answers but of course those answers are determined by what the editor conceives the reader will want to know, and that is difficult to predict.

According to the preface, the book is mainly intended for the non-mineralogist and the advanced professional is expected to "have little use for our volume". The scope is therefore wide, and the references to mineralogical journals and museums are extensive so that inquirers can follow topics to a greater depth than a general survey can provide. Just over 100 writers — most of them in the United States — contribute 140 articles, ranging alphabetically from abrasive materials to zeolites. These are followed by a mineral glossary containing about 3,000 entries of mineral groups, species and varieties, including mineraloids, in which brief descriptions of the chemical formula, physical properties, occurrence and use of each mineral are terminated by references to relevant literature.

In any encyclopaedia the key element is the index. However well organized, erudite or comprehensive the coverage, the information extractable from such a book is controlled by the quality of the index. For mineral names the index is good, but it is inadequate for many other topics on which would-be users could well consult the book. The mineralogical composition of common building bricks or porcelains? Not even the word ceramic appears in the index. Which crystals are used in X-ray fluorescence analysis? What is diffraction? None of these questions can be answered by consulting the index; some of them no doubt lie in other volumes of this mammoth series of earth science encyclopaedias, of which this is only Vol. IVB. Moreover any reference book must have omissions vulnerable to criticism. The mineralogies of cements and glasses are described, however, so the coverage is not restricted to natural occurrences.

In my view the book is too technical for the non-mineralogist. It is three-quarters designed for the professional mineralogist — who will normally prefer more extensive texts or *Mineralogical Abstracts* — although the mineral glossary, which

occupies a quarter of the volume, will be useful as a quick guide into the literature. The information provided about most minerals is that which a *mineralogist* would normally be concerned with, such as optical and crystallographic properties. Items such as chemical properties (as distinct from chemical composition) are rarely considered so that the solubility of minerals in water, the effects of heating minerals together etc. are scarcely dealt with, although eight pages are accorded to the blowpipe analysis of minerals and five to staining techniques, both of which are clearly described. No doubt a major problem for the editor was the lack of available information of an unconventional type, since most data on minerals are provided by mineralogists and the articles were thus largely written by them.

Nonetheless if you want to know about piezoelectricity, phantom crystals, geological barometry and thermometry, pleochroic haloes and thermoluminescence, it's there in a potted form. Also Epsom salt and human and vertebrate minerals, but unless you are a crystallographer the article on point groups and the enumeration of the twin laws of the feldspars will surely leave you baffled — the list of the Council members of the International Mineralogical Association from 1958 to 1978 is more readily understood.

The book, then, will be a useful addition to general libraries. But it is too complex for the non-mineralogist and largely repeats information already available in numerous, recently published mineralogical textbooks. □

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Sex, parthenogenesis and the tangled bank

Mark Ridley

The Masterpiece of Nature. By Graham Bell. Pp.635. UK ISBN 0-85664-753-5; US ISBN 0-520-04583-1. (Croom-Helm/University of California Press: 1982.) £25, \$45.

"SEXUAL generation", wrote Erasmus Darwin, "seems the chef d'oeuvre, the master-piece of nature". Sex is also one of biology's master-problems, and has been honoured by three of the master-works on evolution which have appeared in the last decade: M.T. Ghiselin's *The Economy of Nature and the Evolution of Sex* (California University Press, 1974), G.C. Williams's *Sex and Evolution* (Princeton University Press, 1975) and J. Maynard Smith's *The Evolution of Sex* (Cambridge University Press, 1978). Graham Bell has combined the theorizing and algebra of a Williams and a Maynard Smith, with the comparative biology of a Ghiselin, to produce a book which is, indeed, more than the length of the other three put together. *The Masterpiece of Nature* is a pleasantly written and important work; it can stand with the other three on the shelf, even if it does not edge them over into the wastebasket as its conclusions sometimes imply.

First, some praise for the 170-page review of sexuality which comprises Chapter 3. It is an immense achievement, which systematically reviews the literature on sex and parthenogenesis for all the taxa of multicellular animals. Despite a few minor omissions, it will be of great value as the only available zoological encyclopaedia of sex.

Sex is a puzzle because it has an apparent two-fold disadvantage compared to

asexual reproduction. A mutation which caused a female bearer to reproduce asexually would go into all its offspring rather than just half of them. And the offspring would all be females, which lay eggs, whereas half of the sexual female's offspring are males whose energetic contribution to the next generation is usually nothing. Recent work has mainly attempted to discover some unnoticed advantage to sex sufficiently great to outweigh its huge, two-fold cost.

Bell takes a different line. He is less concerned with thinking up some new theoretical advantage to sex than with finding out which of the existing theories best explains the incidence of sex and parthenogenesis in nature. The facts meet the theories in Chapter 4, and Bell's verdict is that "the problem originally set has been solved" (pp.391–392) in favour of a theory which he calls "the tangled bank". The tangled bank is, in its emphasis, a new theory. It proposes that there is spatial variation of the environment; each species exploits several niches in space. An asexual clone could take over one niche, but then sex may become advantageous. The asexual progeny must compete among themselves within their one, already saturated, niche. The sexual progeny are more diverse, and so are adapted to a greater diversity of niches. Parthenogenesis is, in fact, most common in empty patches and other circumstances of reduced competition.

The tangled bank is closely related to models of what Maynard Smith has called "sib competition". So I was surprised when, in his chapter on the theories, Bell lumps the previous sib competition models

The second volume of the multi-volume treatise *Social Insects*, edited by Henry R. Hermann, has recently been published by Academic Press. Price is \$55, £36.40. (For a review of Vol. I see *Nature* 282, 884; 1979.)