

name is associated, in his mapping of England he sometimes relied primarily on lithological appearances and fell into error thereby.

Laudan lays particular emphasis on the methodological principles employed by early geologists, and seeks to display their several modes of reasoning. She distinguishes between 'causal' and 'historical' geology and, acknowledging that the latter came into prominence towards the end of the eighteenth century, she argues that a balance could be, and was, maintained between the two approaches. One may also distinguish between 'genetic' and 'historical' accounts of the Earth's past — that is between those that explain in terms of antecedent circumstances and laws of change, and those that explain by piecing together the contingent events of the past. Genetic accounts are subsets of causal accounts. Laudan deploys all three of these categories to advantage.

Laudan is also especially interested in methodological questions and distinguishes five approaches amongst the geologists that she examines: the methods of hypothesis, analogy, enumerative induction, eliminative induction and the (Newtonian) *vera causa* method.

The last of these was favoured in the nineteenth century, and Laudan contends that Lyell's celebrated uniformitarian approach displayed the method to fine advantage. A 'true cause' should be one that is known to be physically possible, and equal to its causal task. Inspection of present geological processes should enable both these criteria to be met, and hence Lyell could hold that his method fulfilled the methodological requirements of a 'Newtonian' science. It might seem that one scientist's *vera causa* is another's speculative hypothesis. Even so, Lyell's method did offer a possible route towards *verae causae* (though without certainty of success) and Laudan has surely construed his methodological goals correctly.

The book performs excellent service by displaying the institutional base of the German mining industry, and the Wernerian school which grew from it. There is, perhaps, room for more treatment of the institutional structures that began to develop in Britain and France in the early nineteenth century, and of the means adopted to certify geological knowledge. Personally, I should also have liked more information about the development of field techniques for mapping, drawing sections and so on. But, in general, one may say that a thorough task of synthesis has been performed. □

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A year in the life

Peter Coles

L'Année de la Science. By Roger Caratini. Seghers/Laffont, 6 Place St Sulpice, 75006 Paris: 1987. Pp.551. FF180.

ROGER Caratini and his publishers have set themselves an ambitious project — to publish an annual review, in French, of what's happening in contemporary science; or rather, what happened the previous year. By tackling questions at the leading edge of different disciplines, the intention is to present an up-to-date view of science as it really is, rather than as a static edifice of knowledge.

This 1986 debut amply confirms the author's determination not to popularize. Six 'hard' sciences — astronomy, physics, chemistry, biology, medicine and mathematics — are tackled with a detail that could dissuade readers without a professional or academic involvement with science. It is surprising, then, to learn that the target readership embraces high-school students, undergraduates, teachers and journalists, as well as researchers interested in peeking over the wall surrounding their own specialism to see what their neighbours are up to.

Usually, highly technical reviews are written by specialists for specialists and attract only marginal interest from outsiders. It is something of a shock, then, to discover that the author is not a science researcher, but an encyclopaedist, albeit one of the most experienced in France. This, as it turns out, is an advantage, because the yearbook has a didactic as well as an archival role.

Caratini's status as an outsider gives him a sympathy with his readers, who, he assumes, will expect memory-jogging and a few signposts to understand fields other than their own, but will appreciate the fascination of basic research. Having said this, alarm bells are bound to ring when a non-expert attempts a critical review of research in a specialist field.

Caratini is well aware of the scale of the task he has set himself and, to stifle the alarms, explains his approach. For the 1986 yearbook, he claims to have sifted over 30,000 research papers, finally choosing what to include on multiple criteria, such as frequency of citation. A scrutiny of the 1,200 or so references cited reveals a relatively high proportion of review articles and peer comments, and it is not clear to what extent these were used as the basis for selection and critical comment in the yearbook itself.

Even if the usefulness of *L'Année de la Science* as a critical review must remain doubtful, how well does it work as a reference source? Having lived with the book for a few weeks, I found it both interesting



Treasure trove — Californian acorn woodpeckers can store tens of thousands of acorns in a single tree for use during the winter. The picture, showing a typical granary, is taken from Population Ecology of the Cooperatively Breeding Acorn Woodpecker by W. D. Koenig and R. L. Mumme, which analyses the relationship of food-storing and cooperative breeding in this fascinating species. Published by Princeton University Press, the book costs Hbk \$55, £34.50; Pbk \$16.95, £10.60.

and useful. Earth sciences are not included; but if the 1986 index to *Nature* is taken as a reasonable guide to the main topics in different disciplines, it is otherwise nearly all here, roughly in proportion to coverage in the journal. AIDS (78 references in *Nature*) gets at least 15 pages, for example, while quasi-crystals (5 references) gets three.

The debates are clearly presented, with plenty of illustrations and useful 'foot-holds' in the margins — captions that give the gist of each paragraph. These turn out to be essential when the book is used for quick reference, enabling the reader to skip the introductory basics. At the back of the book is a 30-page glossary, which is a good, concise source of information in itself, and a complete list of Nobel prize-winners and Fields medallists.

The potential weakness of *L'Année de la Science* is that it tries to do too much — to be both a primer for the uninitiated and a reference work for the expert. The juxtaposition of different styles and levels of discourse is uncomfortable at times, and that it is not written in English will make it inaccessible to many potential readers. But the book should provide a welcome relief for scientists whose native tongue is French. □

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