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Earth Sciences

EDITED BY AILSA ALLABY AND MICHAEL ALLABY

THE CONCISE OXFORD DICTIONARY OF EARTH SCIENCES

Edited by
AILSA ALLABY
and
MICHAEL ALLABY

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PREFACE

Setting intellectual boundaries that would serve to define 'geology' has never been simple. As long ago as 1830, in his *Principles of Geology*, Charles Lyell expressed the view that the geologist should be well versed in chemistry, natural philosophy, mineralogy, zoology, comparative anatomy, and botany. For at least a century and a half those who would study the structure and composition of the Earth have had to familiarize themselves with a wide range of scientific disciplines.

In our own century the inclusion of the atmosphere, oceans, and surface waters, the 'fluid Earth', has added more disciplines to the list, while the veritable explosion of new ideas and new discoveries has added still more. The rapid growth in our understanding of continental drift, sea-floor spreading, and then plate tectonics, augmented by dramatic advances in all branches of geophysics and geochemistry, have made it possible — and necessary — to interpret what is seen at and near the land surface in terms of processes that occur far below. At the same time the exploration of the solar system has provided information about planetary formation and evolution that compels us to view afresh our own planet and its history.

Strictly speaking, the word 'geology' describes all studies of the Earth. It is derived, after all, from the two Greek words *ge* ('Earth') and *logia* ('speech' or 'discourse'), linked by an 'o' (as are almost all '-logy' words). Traditionally, however, 'geology' has come to mean the study of rocks. This narrow sense can be broadened to the 'geologic sciences', but the connotation of rocks remains and cannot easily encompass such studies as oceanography or climatology. 'Geoscience' was one term proposed, but apart from involving an uncomfortable marriage of roots from two linguistic sources (*scientia* is the Latin for 'knowledge'), it is incorrect. The prefix being 'ge-', not 'geo-', the word should be 'gescience', which is unattractive.

T. C. Chamberlin used the name 'Earth sciences' to embrace astronomy, cosmogony, and cosmology as well as the traditional disciplines, and Alfred Wegener (originally a meteorologist) also used it, but it was not until the 1960s that it began to gain a wider currency. Learned journals began to use it and, especially in North America, academic institutions began to include it in their titles. *Understanding the Earth*, a British textbook written for the Department of Earth Sciences of the newly formed Open University and published in 1971, adopted the new name wholeheartedly. Within ten years it was widely accepted, used sometimes in the singular, nowadays commonly in the plural. When, in the late summer of 1985, our friends at the Oxford University Press invited us to compile a dictionary of terms used in the topics directly related to studies of the Earth, it was clear, therefore, that it should be a dictionary of 'Earth sciences'.

If the decision about the title of the book was straightforward, it was not so easy deciding which disciplines the term, and so the dictionary, should cover, for although 'Earth sciences' was widely used, opinions varied as to precisely what they include. We had to begin by defining the term for our own practical

purpose. We examined the way it was used by other authors, assembled a kind of consensus, and determined that our dictionary should include terms from climatology, meteorology, economic geology, engineering geology, geochemistry, geochronology, geomorphology, geophysics, hydrology, mineralogy, oceanography, palaeoclimatology, palaeoecology, palaeogeography, palaeontology, pedology, petrology, the philosophy and history of the Earth sciences including brief biographical notes of important figures, planetary geology, sedimentology, stratigraphy, structural geology, tectonics, and volcanology.

Having decided what we meant by 'Earth sciences', we had to define 'dictionary' — another task that is less obvious than it may seem. There are three principal ways to approach such a compilation. The book might be regarded as a small encyclopaedia, containing a number of headings each of which would be the subject of a short essay, together with an index. It might be an encyclopaedic dictionary, with a larger number of briefer essays and a system of cross-referencing. Or it might be a dictionary proper, aiming only to define terms, as many as possible and in as few words as possible. We aimed to adopt the last of these approaches. It was not always possible in practice to contain definitions within two or three short sentences, although we did try to avoid essays. We also thought it helpful to include extensive cross-references, paying particular attention to those entries that unavoidably require the definition of other 'embedded' technical terms. We finished, then, with a cross-referenced dictionary, somewhere between the second and third of the possible alternatives.

However it may be compiled, the task of a dictionary is descriptive, not prescriptive. It records words and expressions that are in current use and explains the meanings attached to them, but it does not impose those meanings or seek to dictate what a correct usage should be. As recorders, we express no opinions. All living languages are dynamic, however. Words come and go, their meanings change, and we cannot assume that those for whom our dictionary is intended will restrict their reading to the most recent literature. They may encounter terms that have become obsolete or fallen from favour, but that have appeared in print and therefore should be included. In such cases we have qualified the definitions, giving the status of terms that are no longer preferred, usually explaining the reason they were abandoned and, where appropriate, indicating former meanings.

Having drawn up the list of topics to be covered, we did our best to allot to each a proportion of the total number of entries indicated by the planned size of the dictionary and our estimate of the average length of each entry. This allocation was not meant as a statement of our opinion regarding the relative importance of each topic. Some subjects generate more terms than others and a rationing system was necessary if those with fewer terms were not to be crowded out by their more aggressive competitors.

We realized that inevitably our dictionary would be somewhat specialized and would appeal principally to serious students and to non-professionals with a deep and abiding interest in the areas we planned to cover. Our entries would have to probe fairly deeply and be quite detailed, and in many cases rather technical, but the dictionary must facilitate communication across rapidly eroding disciplinary boundaries. This made it very important that the information it contained should be as comprehensible to non-specialists and as easily accessible as we could make it. It had to be 'user-friendly'. We believe our

'cross-referenced dictionary' approach helps. Some information is carried in tabular form, but with each item cross-referenced.

Without wishing to repeat ourselves, we would emphasize that the book is meant to be used as a dictionary, to help explain words and expressions found in textbooks and the scientific literature and, where appropriate, the several senses in which they are used. In no way is it intended to be a textbook in its own right.

The Oxford Dictionary of Natural History, published early in 1985, covered a broad range of topics and contained some entries pertinent to the Earth sciences, although they were prepared for a different readership. In the *Concise Oxford Dictionary of Earth Sciences* approximately one-third of the entries, albeit extensively sorted and reworked, have their provenance in this earlier work. Entries commissioned especially for the *Concise Oxford Dictionary of Earth Sciences* comprise the remaining two-thirds.

We were extremely fortunate in being able to bring together a team of people who greeted our project with enthusiasm. Our contributors and advisers have worked extremely hard and we are most grateful to them. We also wish to apologize to those who found themselves working much harder than they imagined they would when they agreed to participate. Writing dictionary entries is much more difficult and time-consuming than it may seem, but we know of no way to explain this adequately to those who have not suffered.

The high standard set by our contributors and sustained rigorously by our advisers makes us confident of the quality of the entries. If mistakes have occurred, the editors accept the blame. The information in this book was up to date when the entries were verified, but in a few cases the inevitable delay between the acceptance of a particular entry and its final publication may have rendered it less so. If this has happened, we apologize.

We wish to express our thanks to the librarians at Polytechnic South West and the Camborne School of Mines who have allowed us free access to their libraries, and to our colleagues at the Oxford University Press.

AILSA ALLABY
MICHAEL ALLABY

Wadebridge, Cornwall
June, 1988

CONTRIBUTORS AND ADVISERS

Ailsa Allaby
Michael Allaby
Dr Keith Atkinson, Camborne School of Mines
Dr R. L. Atkinson, Camborne School of Mines
Dr T. C. Atkinson, University of East Anglia
Dr A. V. Bromley, Camborne School of Mines
Denise Crook
J. G. Cruickshank, Department of Agriculture for Northern Ireland, Belfast
Dr P. Francis, Open University; Lunar and Planetary Institute, Houston
Professor K. J. Gregory, University of Southampton
Dr C. D. Gribble, University of Glasgow
Dr Colin Groves,* Australian National University
Dr W. J. R. Harries, Polytechnic South West
Professor M. Hart, Polytechnic South West
Professor Emeritus H. H. Lamb,* University of East Anglia
John Macadam
Dr R. J. T. Moody, Kingston Polytechnic Enterprise
Dr J. Penn, Kingston Polytechnic
Dr John M. Reynolds, Polytechnic South West
Dr D. Rolls, Kingston Polytechnic
Dr I. Roxburgh
Dr N. A. Rupke, Wolfson College, Oxford
Dr Stuart Scott, Polytechnic South West
Dr B. W. Sellwood, University of Reading
Dr P. J. C. Sutcliffe, Kingston Polytechnic
Professor D. H. Tarling, Polytechnic South West
Joan Taylor
Professor S. R. Taylor, Australian National University
Dr R. J. Towse,* Kingston Polytechnic
Dr I. Tunbridge, Polytechnic South West
Dr C. E. Vincent, University of East Anglia
Professor Brian F. Windley, University of Leicester
Andrew Yelland, Birkbeck College, London

* Contributor to *The Oxford Dictionary of Natural History* whose earlier entries have been transferred to this book unaltered.

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