

The Making of Geology: Earth Science in Britain 1660-1815

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The second edition, then, remains in the strongly descriptive mould of the first edition, and King has been very careful not to be too speculative, nor to pass on currently incomplete plate tectonic interpretations that may soon become outdated. Unfortunately, by following this pattern, King does not transmit the excitement of applying plate tectonics as it is presently understood to the interpretation of the geological record.

If you already own a copy of the first edition, you will perhaps be disappointed by the second. A thorough updating would have been superb, but a piece-meal updating is less than one could have expected. If you do not own a copy at all, buy the second edition to enjoy the literate style of writing and immense breadth of synthesis of North American geology. Finally, Canadian readers will be surprised and disappointed to find that less than six per cent of the book is devoted to the Canadian Shield – rather surprising in view of the physical extent of the shield, the length of geological time represented, and the amount of research devoted to shield problems since the first edition was published.

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Note

The Book Review Editor apologizes for the following errors in A. E. Beck's review of the *Bowels of the Earth* (Vol. 5, No. 1). Page 46, column 2, seventh line from the bottom should read:

$W = W_0[1 + (4/5 \xi - 1) p^4]$. Page 46, column 2, fifth line from the bottom should read: $p=r/a$. Page 46, column 3, line 1 should read: $(4/5 \xi - 1)$. Page 46, column 3, line 40 should read: $p=1$, to $p=0$. At $p=1$, $r=a$ Page 46, column 3, line 42 should read: $p=0$.

The Making of Geology: Earth Science in Britain 1660-1815

By Roy Porter
Cambridge University Press,
288 p., 1977.
\$18.95

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In the development of any amateurish undertaking into a professional pursuit some books dealing with the particular topic of study stand out as prominent landmarks clearly showing the route that will be taken in that development. Roy Porter has given us such a book for the history of geology. This is the approach of a thoroughly professional historian to a part of the history of science that until only about a decade ago was the domain of earth scientists with a personal interest in the past accomplishments of their predecessors. Of course, there are other books with an approach similar to that of Porter. In the present context perhaps the most significant to mention is *The Meaning of Fossils* by Martin Rudwick as it was he who in part supervised Porter's Ph.D. research that is the foundation of *The Making of Geology*. But Porter carried the historiography of geology still a step or two farther down the road of professionalism than Rudwick.

Roy Porter convincingly shows that attitudes towards the Earth and its investigation underwent great changes in Britain between 1660-1815, the period dealt with in the book. Being a historian, he sees as his central problem the often assumed aspects of the culture of science, such as openness, progress, objectivity, and impersonality. The scientific questions asked about our planet, and the manner in which these questions were dealt with, changed markedly in time. It can be shown that such changes and the emergence of *geology* as a science is particularly dependent upon deep social and institutional foundations. One therefore has to understand the development of geology

in terms of the society in which it was rooted. Only then does the history of science become, as it should, "much more than a tale of anticipations and precursors, founding fathers and who described what first".

The Making of Geology deals with three distinct periods: 1660-1710; c. 1710-1775; c. 1775-1815. For each the intertwining of society and earth sciences is discussed in detail for Britain which, however, is rightly not considered in isolation from the European mainland. Elizabethan England saw its mines developed by Germans trained in the tradition of Agricola. Whereas in Continental Europe it was the nobility who supported scientific institutions for its own purposes, in Britain it was the private enterprise of natural philosophers that founded the Royal Society of London in 1660.

The second half of the seventeenth century saw not only the rise in Britain of scholarly societies but also that of the museum and natural history collection. It was then that men like Woodward and Llwyd responded to the ideals of the new Baconian science by travel and first-hand observations. Correspondence as a means of communication between kindred souls flourished. Questionnaires became a fashionable research tool: Llwyd distributed 4000 of them for his survey of Wales. The society at large, however, appears to have displayed mainly indifference. "To what purpose so many Words about so trivial a Subject?" asked John Ray. Do not many non-geologists unfortunately ask that same question still today?

It is popularly assumed that the first three-quarters of the eighteenth century were a dark age in the intellectual life in Britain with *Tom Jones* an expression of its level of interest. Such a view ignores the upsurge in middle-class practical, rational, scientific culture associated with commercial and industrial enterprise. Again it is the modern historian who can bring scientists interested in history but lacking the broad cultural-societal perspective of the past back on track. "To find no peaks of achievement and to conclude thence that it was a period of decline is to be victim of false historical expectations – in particular 'great man' interpretations of history."

By the mid-eighteenth century Romantic travel literature flourished; tourism and holidays became institu-

tionalized. Especially near mineral springs resorts sprang up in scenically spectacular mountain areas whereas as late as 1724 the writer of one popular travel book had shown little enthusiasm about the natural landscape and regarded non-cultivated land simply as dreary waste. By 1800 the truth about the Earth was no longer found in books but in the field in the rocks. Thus geology was born and the scientific study of the history of the Earth broke its bonds with written testimony long before the study of human history did the same. That at least is one methodology in which geologists showed the way to go to the historians.

No short review can do justice to Porter's book which, slim as the volume is, packs an impressive number of facts, figures, correlations, working methods and, particularly important, thoughts. The extensive bibliography is of great help to any teacher of the history of science. Now that this is becoming a respectable subject in many universities geologists can be grateful to have Porter as their spokesman among historians.

This book should be bought, read, enjoyed, studied, and referred to in future by all geologists who desire to raise their conscience with respect to their own science. Here indeed are our "Roots".

MS received January 13, 1978

Hydrothermal Uranium Deposits

By R. A. Rich, H. D. Holland
and U. Petersen
Elsevier Scientific, 264 p., 1977.
\$34.75 (U.S.)

Reviewed by D. S. Robertson
and James Tilsley
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The term hydrothermal is "applied to magmatic emanations high in water content; the processes in which they are concerned; and the rocks or ore deposits, alteration products and springs produced by them" (Holmes, 1928).

In the light of this definition, which is common to the understanding of most economic geologists, the book under review is unfortunately misnamed.

The text describes all uranium deposits which are not 'conglomerates', sandstone deposits or 'calcretes' as hydrothermal. While some of the deposits described appear to be, with data presently available, of hydrothermal origin (by the above definition) many, including those of most economic significance, give no evidence of being related to magmatic processes. Indeed, the authors acknowledge the possibility that these deposits are formed from surficial waters (p. 71).

The book is divided into two parts, the first being a review of the geochemistry and mineralogy of 'hydrothermal' deposits while the second provides descriptions of individual deposits from North America, Australia, Europe and Africa.

Part I leans heavily on laboratory analysis and data collected from fluid inclusions. Each of the six chapters making up this section is accompanied by a broad selection of references.

Part II deals with descriptions of 'hydrothermal' deposits in most well known districts. To one familiar with uranium deposits the descriptions are brief to the point of uselessness. Geology of the deposits, in the main, is described in only the most limited way, the descriptions leaning heavily on lists of mineral associations. The lists of reference, again, provide a broad selection.

There is a limited attempt by the authors to provide the kind of synthesis useful to practising mining and economic geologists, those for whom the book purports to be published.

MS received December 23, 1977

Analytical Methods for Use in Geochemical Exploration

By R. E. Stanton
Halsted Press
(a division of John Wiley and Sons, Inc.)
54 p. 1976

Reviewed by R. C. Armstrong
Cominco Ltd.
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This work succeeds a previous volume by the same author (1966) entitled *Rapid Methods of Trace Analysis*, which dealt exclusively with colorimetric methods of geochemical analysis. Since that time analysis by other analytical methods have become popular and the new volume presents a discussion of these methods. Chapter 1, *Statistical Control of Analysis* (2 p.) deals with a method for the geologist or geochemist to check the reproducibility of the analysis of their samples. The method, called the Craven statistical series, is particularly useful for those with in-house laboratories where once the control samples are established, they can be entered quickly and easily to provide high quality analytical results. The method is not so easily adapted for those who have their samples analyzed in a commercial laboratory. Chapter 2, *Reagents* (2 p.) provided a short description of the properties and dangers of 11 less well known reagents discussed later in the book. Chapter 3, *Methods of Colorimetric Analysis* (19 p.) deals with some of the methods described in his previous book and includes those for metals of current interest in mineral exploration such as Sn, W and Mo. Methods for Bi, B, Pd + Pt, Th and V are also included. The next Chapter on *Cold Extraction Methods of Analysis* (11 p.) briefly explains the use of cold extraction methods in geochemical exploration. Methods for the determination of base metals and As are discussed and, in addition, the concentration ranges covered by the various methods and the productivity in samples per man-day are listed. Chapter 5, *Analysis by Atomic-Absorption Spectrophotometry* (8 p.) begins with a short introduction of the basic principles followed by a discussion of instrumentation (a diagram would have helped) and a presentation of a variety of analytical methods for a large number of elements. The chapter focusses attention on the sample decomposition and briefly describes the chemical reactions which take place. A chapter on *Analysis by X-Ray Fluorescence Spectrometry* (4 p.) discusses the use of this technique in the analysis of As, Bi, Au, Pd, Pt, Se and Te. Procedures for the preconcentration of these elements prior to bombardment are given. The final chapter on *Analysis by Emission Spectrography* (6 p.) was contributed by C. H. James and deals with the application of spectrogra-