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Hydrothermal Uranium Deposits

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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.
120 Adelaide St. W.
Toronto, Ontario

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 instrumentations (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-