



BOOK REVIEWS

The Nature and Origin of Granite. 2nd edition

Pitcher, W. S., 1997. Chapman & Hall
 ISBN 0 412 75860 1. Library of congress catalogue
 number: 97-65818. Listed price US\$119.95, £65.

The first edition of W. S. Pitcher's authoritative book, published in 1993, was, as far as one can judge, very well received by the geological community and, by any standards, highly successful. This second edition, coming some 4 years later, is a revised and updated version; being basically an expansion of the 1993 text with a lot of new material added. The avowed aim of the text book is not to provide a complete factual summary of everything that is known about granites together with a blow by blow account of the intricacies of the various methodologies employed (a style and format that may be found in adjacent, 'alternative' texts). Rather the author writes a series of self-contained essays, each covering a particular topic and all interlinked in such a way that the really major problems become clearly and precisely revealed within the greater context. I believe that this is a very successful format which allows the author to develop an appreciation in the reader of the broader interconnections whilst concentrating on the messages of the really key texts and sparing us from "the ever accumulating thicket of literature which threatens to overwhelm the very science it aims to report".

The basic structure of the text is retained from the first edition with nineteen chapters of varying length in a book of 350 pages. The chapter titles are as follows: (1) The historical perspective: an ever changing emphasis; (2) The categories of granitic rocks: the search for a genetic typology; (3) Granite as a chemical system: the experimental impact; (4) The physical nature of granitic magmas: a case of missing information; (5) The evolution of the granitic texture: a continuum of crystal growth; (6) Differentiation in granitic magmas: zoning as an example of multifactorial processes at work; (7) The volcano-plutonic interface: not Read's hiatus; (8) The evidence for restite: unmixing as an alternative hypothesis; (9) The mingling and mixing of granite with basalt: a third term in a multiple hypothesis; (10) Appinites, diatremes and granodiorites: the interaction of 'wet' basalt with granite; (11) Controls of upwelling and emplacement: the response of the envelope: balloons, pistons and reality; (12) On the rates of emplacement, crystallisation and cooling; (13) Plagiogranite and ferrogranophyre: extreme differentiation in contrasted situations; (14) Cordilleran-type batholiths: magmatism and crust formation at a plate edge; (15) Intraplate, rift-related: mainly the A-type, alkali feldspar granites; (16) Migmatites: are they a source of granitic plutons?; (17) The waning stages: the role of volatiles in the genesis of pegmatites and metal ores; (18) The sources of granitic magmas in their various global tectonic niches; (19) A kind of conclusion: a search for order among multifactorial processes and multifarious interactions.

The chapters, whose titles, apart from Chapter 13, are unchanged, have been brought up to date with new research material and with a lot of new comments and thoughts by the author. Those areas which have received the greatest injection of new material are Chapter 3, where there is very welcome reporting of new experimental work; Chapter 4, where recent experimental results have changed many of our concepts of the rheology and viscosity of granitic melts; Chapter 5, which receives a major new input from the stereological appreci-

ation of three dimensional granitic textures and new revised sections on crystal nucleation, growth, and paragenetic sequences; and Chapter 11, on emplacement, which has been revised to take account some recent important discussions on ballooning and on the 'dykes versus diapirs' debate. The important Chapter 12, dealing with the vital matter of rates of magmatic processes, has also been updated with new information from recent papers. The chapter on the plagiogranites has also undergone a considerable expansion. Chapters 15 (A-type granites), 16 (migmatites) and 17 (granite related ores) have all benefited from the inclusion of much new material and from the consequent organisational changes. I could find only two chapters that had not been altered at all: Chapter 19, which contains the central message of the book on the relationship between magmatic processes and types and tectonic habitats, and Chapter 9, on mingling and mixing. All of the remaining chapters have been revised to varying but non-trivial extents.

So a fairly comprehensive and up to date revision is on offer here. The new book is approximately 50 pages longer than the first edition and contains an extra 146 papers referenced. For this, the price is somewhat lowered although at the expense of a fairly 'thin' feel to the paper and a somewhat poorer quality of figure reproductions. In all, I think it is a good value for money and a better book than before. It should now appeal to the new generation of research students, if not to their impecunious supervisors. Pitcher's text, despite these changes, has not lost any of its sparkle, enthusiasm, vitality and authority. This is a very readable book, the quality and simplicity of whose English is to be greatly admired. Whilst you may not agree with all of the author's opinions and views (of these there are many, but most are clearly identifiable as such), you will be left in no doubt about the nature of the scientific problems that the study of granite, in all its facets, represents. Pitcher moves easily through the material, understanding, explaining, using his own words to bring you into the heart of the matter. Once read, you are then in a position to jump into the front-edge controversies; the book launches you into the science. It would, however, be a mistake to see it as a purely teaching and instructional text. The author's central ideas on the nature and origin of granite are stringently argued but nonetheless uncompromisingly asserted. For example: (1) Tectonic control is regarded as paramount and the fundamental differences between the granite types and associations is closely related to their 'tectonic niches'; (2) granites do 'image' their source rocks; (3) the three crucial things we do not really understand and which govern so much of what happens (melt extraction, restite separation, fractionation, contamination, magma mixing, ascent mechanisms and velocities, and emplacement depths and styles) are: rheology, rheology and rheology.

Many were the praises in reviews of the first edition of this book and the present reviewer will make no exception to that. One is aware, as well, of another viewpoint of this work that is well presented in its opening chapter which deals so eloquently with the historical context and perspective of granite research. Thus my final comment is to say that surely this fascinating and timely discourse will earn its place amongst the great works and treatises on the nature and origin of granite that we are heir to.

Donny Hutton

*School of Earth Sciences
 The University of Birmingham
 Edgbaston, Birmingham B15 2TT, U.K.*