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Microtextures of Igneous and Metamorphic Rocks

Microtextures of Igneous and Metamorphic Rocks

J. P. Bard

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Translated from the French by Marianne Mareschal
English edition edited by S. W. Morel

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Preface to the French Edition

At a time when 'textural' evidence is regarded as being 'obvious' (...) it becomes more and more difficult to find illustrations or even descriptions of the arrangements of the various constituents of 'traumatized' rocks. It is helpful in consequence to advise geology students that the study of thin sections is not only concerned with the identification of their mineral content. To do so would mean they could not see the wood for the trees. Accurate identification of the individual minerals that form rocks is fundamental in their description but the analysis of their textures and habits is also essential.

Study of textural features enforces constraints upon the interpretation of the origin and history of a rock. The analysis of micro-textures cannot and should never be an aim in itself, but must be supported by qualitative and quantitative correlations with theories of petrogenesis. The aim here is to help the reader to bridge the gap between his observations of rocks under the microscope and petrogenetic theories. The habits or architectures of crystals in rocks may resemble those studied by metallurgists and glass scientists. Analysis of micro-textures is undergoing change engendered by comparisons between manufactured and hence minerals. This can be seen from the increased number of publications dealing with crystal growth or deformation processes at microscopic scales to which the name of 'nanotectonics' has been applied.

This book has been made possible by support, encouragement, criticisms and financial help of several co-workers and French and foreign agencies. I would like to thank particularly Professors Albared, Juteau, Fabries, Touret and Mattauer; Drs. Caby, Bertrand, Leblanc, Matte, Lasnier and Martinex, as well as young researchers such as Mr. Nicollet, Mr. Leyreloup, Mr. Crevola, Mrs. Mohamed-Touret, Miss Seyler and Miss Boullier. I appreciated the help of Dr. C. Schoneveld, one of Prof. Zwart's students, and am grateful especially to Drs. J. Warner and P. Butler who permitted me to use examples from NASA's lunar rock samples.

Finally, I thank the editors of various books and journals for allowing me to reproduce various figures.

The French version of this book was given to Masson Ed. in teletyped form in order to minimize its cost for the students for whom it was largely written. This task was undertaken by Mrs Lanco whom I want to congratulate and thank gratefully for her help. For the sake of economy I drew most of the diagrams; a task which kept me away from home for long periods of time and for which my wife and children (...) will never forgive me completely.

Montpellier and Palavas Les Flots, July 1979

Preface to the English Edition

One must never forget that the first attempt to catch the petrological story of a rock always begins with the serious study of thin sections, not only to specify the nature of the minerals but, and overall, to analyze the mutual relations (the microtextures) of these minerals. Recent progress in metallurgy, ceramics and glasses, as well as recent attempts to make comparisons between manufactured products and natural rock textures, have opened new ways to understand and interpret the microtextures of igneous and metamorphic rocks. Students and teachers would probably appreciate a general textbook dealing with these questions. As it was the will of the author, a teacher in petrology, the present edition is not a static catalog of textures, as is the case with other books, but rather a test to dynamically correlate the theoretical discussions dealing with crystal growth in melts and solids with some classical microtextures exposed by various endogenetic earth (and some lunar) rocks.

This English edition is an enlarged and updated translation of the original French edition.

Montpellier, July 1986