

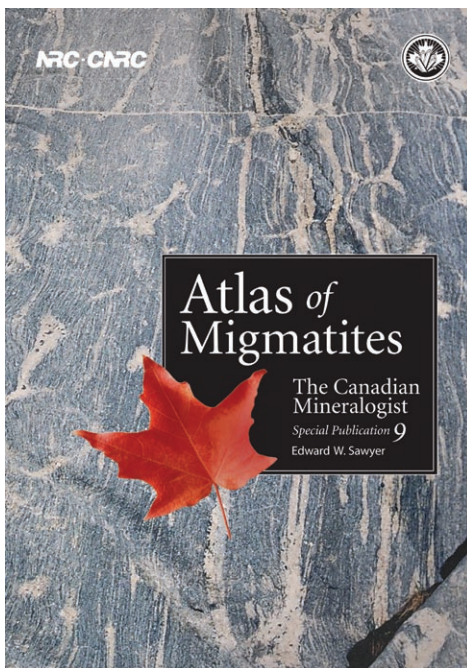
ATLAS OF MIGMATITES*

Each year, many studies of migmatites (most simply defined as rocks that show evidence of partial melting) from all around the world are published. The eager audiences include metamorphic and igneous petrologists, geochemists, and a sizable “migmatite fan base” of structural geologists. However, aside from edited collections of papers, there has been no overarching review of migmatites and the processes that create them since Karl-Richard Mehnert's book *Migmatites and the Origin of Granitic Rocks*, published in 1968.

To give an idea of Mehnert's concerns and milieu, the very first sentence of the preface of his book explains to readers that he was fully aware of the “strange” juxtaposition of migmatite petrogenesis with “the granite problem.” From the perspective of the next generation of petrologists, important linkages were either made or being made in the late 1960s, and “the granite problem” did not long survive the Age of Aquarius. However, achieving a workable understanding of the relationship between migmatites in outcrop and their petrogenesis, and of the implications for the origin of granite has not just survived the three decades since Mehnert's book. The challenge has grown, as more and more descriptions of migmatite outcrops, mineral assemblages, and geochemistry are published. Now, the many fans of migmatites are gratified to have in hand a wonderful migmatite *weltanschauung* from a highly respected student of the subject.

Edward W. Sawyer has used the unifying concept of an atlas (which has already been brilliantly exploited by B. W. D. Yardley, W. S. MacKenzie, and C. Guilford for metamorphic rocks and textures) to explain how he thinks migmatite outcrops have come to be. The astute reader has already discovered that I have added two pages to the length of the book. This acknowledges a clever use of space by Sawyer, who placed an index of textural types of migmatites in the frontispiece of the book and a description of the parts of a migmatite on the endpaper. Combined, these two tables provide a very handy reference for readers. The book itself consists of a lengthy monograph, which represents a comprehensive introduction to migmatites and how they are studied, and a gallery of described photographs.

The monograph is wide-ranging in the topics covered, but very much reflects the author's longstanding interest in combining field and petrographic observations with careful geochemical studies to understand the origin of migmatites. The first seven pages of the monograph are devoted to a lucid exposi-



tion of the history and current nomenclature of migmatites. Even though I am not a specialist in the subject matter, I did learn that a workable classification of migmatites can be based upon the degree of partial melting, and then can be further subdivided by field-scale observations of outcrop textures. Sawyer states that he thinks it unnecessary to use a rigidly nongenetic nomenclature for migmatites. His genetic terms are in fact more descriptive than they are fully process-linked. For example, on page 15 he describes “dilation-structured migmatites” as the “surreitic structure of Mehnert, 1968”—Sawyer's terms are in this and many other cases immediately intelligible to the non-migmatite-ologist. He includes a section on “migmatite-like rocks,” in which he discusses subsolidus mineral segregation, granite veining, and other processes that can yield rocks that look a lot like migmatites but that never actually underwent partial melting. The monograph is written so that it can be easily read with reference to the photographs and their captions. The references create an impressive late twentieth- and early twenty-first-century overview of migmatite science.

But this is an atlas, and on the pictures and their descriptions will an atlas rise or fall. I am pleased to report that all is well with this atlas. It is always a joy for students of metamorphic rocks to see beautiful and evocative outcrops, and Sawyer's atlas is, at its core, a grand tour of a world full of gorgeous, interesting migmatite outcrops. This may in part derive from the large proportion of images supplied by the author. Sawyer's sensibilities have created overall color and composition standards for the pictures. Certainly almost all of the images display excellent clarity and color rendition. One can truly get a sense of the differences and similarities between various migmatite groups by an exploration of the atlas. Some hand sample images show rocks that have been treated with feldspar stains to help bring out the microtexture.

Most of the photomicrographs and SEM images follow the “field shots,” with the former concentrated between pages 247 and 350. The macro- to micro-organization of the migmatite atlas is very useful to nonexperts, because taking a short course on outcrops is the best preparation for understanding the microstructures. The accompanying text is in general clear, especially as the reader is aided by the charts in the front and back of the book. When available, references specific to the image accompany the explanatory text.

Indeed, my only complaint about the atlas is minor and reflects a personal prejudice. The atlas has very few cathodoluminescence (CL) images of microtextures, and full-color CL is not explored at all. This is surprising, because Sawyer has used CL successfully to study migmatites. If migmatite genesis can be better understood by mapping the visible light activated by minor and trace elements—as a recent publication by the author suggests—it would have been nice to see this imaging technique used and discussed more. However, this very minor issue does not lessen my admiration for an atlas that so comprehensively and carefully brings together and discusses images of a very important group of metamorphic rocks.

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* Sawyer EW (2008) *Atlas of Migmatites*, Canadian Mineralogist Special Publication 9, Mineralogical Association of Canada, Quebec, Canada, 373 pp, ISBN 0-780660-197876, \$140