

## Canada Rocks: The Geologic Journey

Nick Eyles and Andrew Miall

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There is a new book in the geological firmament, a massive, readable, often entertaining tome on the geology of Canada by Nick Eyles and Andrew Miall. *Canada Rocks: The Geologic Journey* presents the complex and spectacular geology of Canada as it evolved from distant orogenies in the Archean Slave Province to the last “terrane wreck” in the Canadian Rockies. Although the authors are distinguished academics, the book is designed to reach a much wider audience, including the interested public, undergraduate students and even specialists who would benefit from a general overview of Canadian geology. The authors clearly know their trade: the audience is skilfully engaged through the use of plain language and the generous use of full-colour photos, maps, drawings and even paintings from the Group of Seven. When yet another orogeny crumples the Maritimes, the spell is broken with pop-up biographies of Canadian heroes of geology or whimsical geologic anecdotes such as “the Queen in camouflage”. There is purpose behind this casual style, however. Just about everything has happened to Canada: it has been torn apart, put back together, stretched, bombarded by meteorites, filed down by glaciers, drowned and eroded so many times that patterns emerge from repetition. By interpreting these patterns in Canada, the authors leave the reader with a solid understanding of how the world works as a whole.

The overall organization of the book is well-designed to meet these objectives. The first three chapters lay the groundwork for a book of general interest by introducing the reader to the early formation of the Earth and the concept of deep time; the Earth’s

interior and the concept of plate tectonics; and finally, for future reference, a history in quick time of the evolution of the continents with an emphasis on Canada. Then follows the core of the book: five chapters arranged in order of timing, on the great geologic events which formed Canada: the formation and evolution of the shield; the drowning and draining of the shield; the accretion of the Maritimes; the evolution of Arctic geology; the accretion of western Canada; and continental glaciation. The book concludes with chapters on Canada’s mineral and energy wealth and environmental issues plus a glossary, index, references and time chart.

While the book is well-designed and written, it suffers from serious technical and scientific editing problems. The first few chapters are repetitious and confusing. For example, the evolution of the continents from Arctica and Nena to now is carefully developed in chapter three, then repeated all over again in chapter 4. The figures are one of the great strengths of the book but they are so numerous that many are displaced far from their associated text. Many figures are called or presented out of order while others are not called at all, often making it difficult to track figures and text. Adding to the confusion, some figures were orphaned from their legends when they were taken from other sources, and a few are uninformative, misleading or simply incorrect. Thrusting along the Grenville Front, for example, was from the southeast, not the northwest (Fig. 4.12) and few geophysicists would claim that subduction extends directly to the core-mantle boundary (Fig. 2.4).

More serious are numerous errors in facts. Yes, the upper mantle is composed of peridotite, but the lower mantle is thought to be composed predominantly of perovskite and magnesiowüstite. The density of peridotite is closer to 3.3, not 2.3 g/cc and its compressional wave velocity is 8, not 7 km/s. Seismic waves are not “electromechanical waves” and it is misleading to liken the Earth to a giant nuclear reactor. Ultramafics are serpentized, not basalts. The flat surface of the Cape Breton Highlands is no longer considered a peneplain cut

to sea level. Seismic reflections are caused by velocity-density contrasts, not chemical-density contrasts. And on and on. In fairness, many of these problems occur in the first three chapters before the authors hit their stride and their specialties in the core of the book. But to be fair to the reader, it would have been better to have carefully read the book from beginning to end, to sort and edit the figures and to correct the text before rushing to publish.

Despite these problems, *Canada Rocks* is a wonderful book in many ways. It is packed with information; it fills a broad popular niche and is truly a pleasure to read. My only serious recommendation is that next time, before the book goes to a second printing, as it deserves, it needs careful scientific and technical editing; details available upon request.