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Reading the Rocks - The Study of the Geological Survey of Canada 1842-1972

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See table of contents

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Book Reviews

Reading the Rocks - The Study of the Geological Survey of Canada 1842-1972

By Morris Zaslow
The MacMillan Company of Canada Ltd. Toronto, 599 p., 1975.
Also available from the GSC or from Information Canada
$25.00.

Reviewed by W. O. Kupsch
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Morris Zaslow's book gives the reader much more than the subtitle - The Story of the Geological Survey of Canada 1842-1972 - implies. It places that story within the temporal development of the earth sciences and within the political and economic history of the 19th and 20th century Canada.

Dr. Zaslow, a historian, with a special interest in northern Canada, is well qualified to provide the right perspective with respect to other aspects of our national history. He has also been most successful in acquiring a scientific background that was foreign to him at first. Only in a few places does he give himself away as a non-geologist: present-day geologists use "overlain by" rather than "overlaid by", but the author stays with nineteenth century and, incidentally, correct grammatical usage. More serious is the possibility that the reader gains the impression that the "Law of Superposition" is derived from the concept of "Uniformitarianism" (p. 31), or that the Missouri Coteau has not been glaciated (p. 155). Also, the use of "sheer planes" for "shear planes" (p. 268) does not appear to be a printer's error. It is to be regretted that the editorial assistance given by the GSC and acknowledged by the author did not correct these annoyances.

The author is at his best where he deals with personalities. The word profiles of Sir William Logan, G. M. Dawson, R. W. Brock, and W. H. Collins are small gems. The subjects are not spared criticism, some of it severe, where Zaslow holds that the historic record indicates that criticism is warranted. Neither is he skimpy in his praise where it is deserved. What emerges then is people in all their strengths and weaknesses. People who have helped to build Canada as we know it today.

Reading the Rocks is what the officers of the GSC have been doing now for more than 130 years. That much should be common knowledge. What also should be known by the public, but what is not, are the other contributions made by the Survey. There is, for instance, the matter of science policy or the education of earth scientists through practical experience.

Someone who believes that Canada did not have a science policy before Lamontagne should consult Zaslow's book and learn about the shaping of just such a policy in our oldest governmental, science research institution. What else than a "centre of excellence" was being built by Logan who staffed it with the best qualified scientists he could find?

And did the Survey not discover more than a century ago that research and education go hand in hand? All through its existence opportunities were offered to its employees and others to increase their knowledge through practical experience in the field and in the laboratory. The effects this policy has had on the training of earth scientists in Canada have been monumental.

Canada's image to the rest of the world is very much one of a country

Dr. D. J. McLaren, Director of the Geological Survey of Canada, presents a copy of Reading the Rocks *to the Hon. Donald S. Macdonald, Minister of Energy, Mines and Resources. (Official EMR news release - can it be that the GSC commissioned this historical study as much for Ministers as for the Canadian public? Ed.)*

populated by miners rather than farmers. Never mind that the dollar return from agriculture is greater than from mining. What is more, we are regarded as a "northern" nation while in fact most Canadians huddle together along the U.S. border. It is simply that gold searchers of the Klondike are more romantic than the clerks of Windsor, Ontario.

The Geological Survey of Canada reinforces these images with its most outstanding work in Precambrian geology and its explorations of the remote sub-arctic and arctic regions. This is the stuff out of which heroes are made. Let all school children learn about the snowshoeing of the brothers Tyrrell, the sailings of A. P. Low and his planting the flag on Ellesmere Island. Every nation has and needs its heroes but Canada appears to make a special effort to hide them. With *Reading the Rocks* there is now, however, no longer an excuse for teachers not to know about our country's great explorers and to fail to tell our children about them.

Dr. Zaslow then has done this nation a great service in writing the Survey's history. The GSC is to be commended in having given the assignment to this particular author. The book is thoroughly researched, a truly scholarly contribution, yet it is most readable and full of human insight. Some chapters, particularly "Washing Dirty Linen", could well be made into TV spectaculars to rival scenes of Pierre Burton's "The National Dream".

Considering the many illustrations, some of them in colour, the price is reasonable. Although it may be unfair to criticize the quality of photographs taken many years ago, it should be said that several are less than satisfactory, showing no contrast but having a washed-out appearance. The coloured maps, including a portion of Logan's magnificent, rare "Geological Map of Canada, 1866" (not published until 1869), on the other hand, are excellent.

One last comment: why did the publisher not give us a more imaginative cover? Once the dust jacket (which is attractive) is worn out and thrown away, all that is left is what looks like the standard Ph.D. thesis. The contents deserve a much better wrapping than that.

MS received August 5, 1975.

Sedimentary Rocks, Third Edition

By F. J. Pettijohn
Harper and Row, Publishers, 628 p. 1975.
$19.95

Reviewed by Erich Dimroth,
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A new, completely rewritten, edition of the classic textbook on "Sedimentary Geology" by F. J. Pettijohn has long been overdue. This third edition, like the second, stresses the descriptive aspects of sedimentary geology, particularly field relations, textures, and structures of sedimentary rocks. The reader will find thorough discussion of the terminology and classification of sedimentary rocks and of the parameters used to describe them (terms of grain size, rounding, classification of sedimentary structures, etc.), and much historical background material. By contrast, processes of sedimentation have been neglected. The volume contains very little on subjects as important as the hydraulics of sediment transport and deposition, the chemistry of precipitation processes, and processes of mechanical and chemical diagenesis. The aim of the author is "to show the student . . . how to read rock history, how to make an interpretative analysis of what he sees." Subjectively, I would like to restrict this: it appears to me that analysis of the tectonics and history of sedimentary basins, not analysis of the rock-forming processes, are the author's most important objectives.

Basically, the volume consists of three parts. A very brief introduction (Chapters 1 and 2, 24 p.) is followed by extensive discussion (Chapters 3-5, 129 p.) of the parameters used to describe sedimentary rocks: the texture of sediments, their internal organization and structure, and the geometry of sedimentary bodies. Detailed descriptions of the main rock families (Chapters 6-11, 308 p.) form the main body of the book. The sequence of chapters is familiar from the second edition except for the addition of a section on volcaniclastic sediments. Their contents, however, have been much augmented and they include much of the newer data. As could be expected, changes are particularly profound in the section on limestones and dolomites. A brief digression on diagenetic segregation follows (Chapter 12, 21 p.). Introductions to provenance, paleocurrents and paleogeography, environmental analysis, sedimentation and tectonics, and sedimentation and earth history (Chapters 13-17, 116 p.) conclude the volume.

The book is well produced. There are few misprints and the quality of photographic reproduction is acceptable. As one could expect, there are few outright errors and those that exist are not very consequential. For example Figure 11-23 shows beautiful pore-filling rim-cement greenalite granules not, as stated in the legend, a "chert matrix" (compare Fig. 11-23 and Fig. 3-44). A few errors are more consequential: contrary to the statement on p. 534, large-scale (over 10 cm) cross-bedding does not invariably indicate shallow-water deposition. It occurs quite commonly in conglomeratic flysch of Gaspé and a trough cross-bed 30 meters wide has been observed in sub-aqueous pyroclastic flows at Rouyn-Noranda.

Discussion of genetic models is markedly sceptical and, therefore, commonly is inconclusive. Such scepticism is plainly justified where genetic models are based only on "theoretical or experimental studies", because these only "suggest possible mechanisms". Pettijohn's rendering of presently popular models of the evolution of the earth's atmosphere, or on deposition of iron-formation, are refreshing; these models are virtually unsupported by field or petrographic data. On the other hand, observation of sediment-forming processes taking place today has permitted to formulate process-response models that form the basis of actualistic interpretation of ancient sedimentary rocks. Such processes have been observed to take place, they are far more than "possible mechanisms" based on "theoretical or experimental studies". Thus, I feel that the author's goal has not been plainly achieved. The student will not be able to interpret what he sees at depth without more serious consideration of recent sedimentation processes.