

Roadside Geology of Ontario: North Shore of Lake Superior

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REVIEWS

Active Tectonics and Alluvial Rivers

By Stanley A. Schumm, Jean F. Dumont and John M. Holbrook

Cambridge University Press
40 West 20th Street
New York, NY 10011-4211 USA
2000, 276 p., US\$80 hardcover
ISBN 0-521-66110-2

Reviewed by Andrew D. Miall

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The theme of this relatively slim book is that river patterns are a sensitive indicator of structural movements. Drainage networks may reveal underlying structural control, channel patterns adjust to changes in slope, asymmetric meander belts may indicate lateral tilts, and so on. There may be corresponding effects on the architecture of the resulting fluvial deposits. Complex uplift and unroofing histories may be deduced from fragments of valleys and terrace deposits uplifted and erosionally isolated by subsequent movements.

These are not new ideas, and in fact most of the material in this book has appeared elsewhere in research papers and books published by the senior author and his former students. The work of Ouchi, for example, on the response of rivers to tectonic movements across their path, was published in *Geological Society of America Bulletin* in 1985, and there is repetition of material from more than one of Schumm's many previous books; for example, a discussion of the river Nile that appeared in his 1994 work, "The variability of large alluvial rivers." The material

that will probably be new to most geologists is that contributed by co-author Dumont based on his numerous studies of the Amazon basin. Most of this work has appeared previously in geomorphological journals or in South American publications that will not be familiar to most Canadian earth scientists.

Applications of this information to the geological record seem a little thin, such as discussions of the tectonic controls of sedimentation that can be deduced from alluvial stratigraphy, and discussions of the relevance of the work to economic activity, such as petroleum and coal development. Most of these topics have been covered in much greater detail by other authors. There is little here about modern work in such areas as sequence stratigraphy.

The book is physically well produced, with mostly clear, elegant diagrams, but there is no author index, and the subject index is barely more than a page long, half of it consisting of a list of modern rivers mentioned in the text. Altogether I would have to say I am disappointed by this book. However, those new to the subject of tectonic geomorphology who are not familiar with Schumm's previous work would find it useful to start here.

Roadside Geology of Ontario: North Shore of Lake Superior

By E.G. Pye

ROCK ON Series 2
Ontario GEOservices Centre
Ontario Ministry of Northern Development and Mines, Publication Sales
933 Ramsey Lake Road
Sudbury, Ontario P3E 6B4
1997, 164 p., \$16.95
ISBN 0-7778-5850-9

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Ed Pye, Director of the Ontario Geological Survey until his retirement in 1983, is the author of this fine guidebook, an updated and extensively revised version of an earlier edition he also authored (1969). This is an interesting and highly scenic area of Ontario with a wide variety of rock types, and an array of classic names including Keweenawan, Sibley, Animikie, Huronian, Rove, Gunflint, and others. I have driven through this area a number of times, but without the useful geological information at hand that this guidebook provides. It is attractive, well-organized and illustrated, and easily used, especially so because it has a ring binder format that on opening *stays* open (guidebook authors take note). The writing style is brief and informative, concentrating on what can be seen in outcrops and view locations, and what this means in layman's terms. One does not have to be a practicing earth scientist to understand this book: every effort has been made to keep the technical terms to a minimum.

A two-page Introduction describes the content and approach, including a section on "How to Use This Guidebook." Five parts follow. Part one covers general geology of the Lake Superior region, discussing such topics as the Precambrian, the Canadian Shield, greenstone belts and intrusive rocks of the Superior Province, subdividing the Superior Province, some of the major rock units including the Animikie Group, the Rove Formation, Southern Province, the Great Ice Age and its deposits, and many others. Part two, the meat of the book, in 108 pages covers 12 trips from the Thunder Bay area in the west to Sault St. Marie in the east. Each of the trips follows a similar format, opening with a full-page simplified geological map of the trip area and continuing with short subtitled sections on the geological features and history to be seen in the trip area. There are no road logs given, but distances in miles and kilometres are noted in the text such that it is easy to find the features discussed: most of them are along major highways. Two of the trips focus on the geology of cities and vicinity, Thunder Bay in the west and Sault St. Marie in the east. The other 10 trips essentially follow the north shore of Lake Superior, with side trips to important features, e.g., the Winston Lake Zn-Cu mine north of Schreiber, Obatang Provincial Park north of Wawa, and others. Generally the trips link one to another proceeding from west to east: trip one leads into trip two, *etc.* Unfortunately there is no full-page overview map on which all trips can be seen in relation to each other even though there are large-scale maps in the general geology introductory section. This is not serious, as trips are complete in themselves.

The great scenery of this region largely depends on bedrock geology, and for all of the trips this is well described. Specific features covered in the trips include Kakabeka Falls, the Sleeping Giant, Lake Superior's oldest mine (copper and silver, near Cloud River, worked in 1846 and 1847), Trowbridge Falls, the Silver Islet Mine, amethyst deposits of the Nipigon region, Hemlo gold mines of the Marathon area, the Michipicoten iron mining area in the vicinity of Wawa, and a multitude of others. There are a large number of

provincial parks and spectacular viewpoints along the north shore of Lake Superior, and most of them are discussed in the 12 trips noted.

The third part of the guidebook is a short section on rocks and minerals for the collector, mentioning a number of collecting sites, and giving descriptions of 44 common minerals and rocks from agate to staurolite as may be encountered in the area. Part four is a ten-page glossary of geological terms with definitions carefully chosen to be informative and jargon-free. Part five, titled "Additional Information," gives selected references as well as information on how and where to obtain maps, reports and further detail from resident geologists and mining recorders offices in the area.

So these are its good points: what could be improved in another next edition of this guidebook? Many colour photographs appear in this book: all but 14 of the 135 photos are in colour. A problem is that most of them are only one column in width, 5.5 cm. Although this is surprisingly successful for some photos, that's too small to do justice to the detail which seems to be present in many others. In the few instances in which photos are reproduced at one and one-half or two column width, 11+ cm, the photos are more successful at conveying information and more pleasing to view. I'd have preferred to see fewer photos used, such that more of the photos included could appear at one and one half or two column widths.

A few of the trip maps don't have all of the geographic names mentioned in the text, which sends one scurrying to the highways map for help. The full-page trip map legends don't show the age assignments of the units portrayed, *i.e.*, what is Archean, Proterozoic, Pleistocene, *etc.* This won't be a problem for those familiar with the geology of the area, and some of the information can be obtained in the Introduction, but it would be helpful to have it on the map legends, especially for non-earth scientists at whom the book is aimed. On reference material the list is useful, but there is no mention of the exciting Lithoprobe work which was underway in the 1990s within the Western Superior and Abitibi-Grenville transects. OK, OK, this is earth sciences material, not for the public: but exciting

new levels of understanding have come from these transects that are worth at least a passing mention. One early paper (in terms of Lithoprobe) not in the references is Ken Card's summary account of the Archean accretion origin of the Superior Province, published in 1990 in *Precambrian Research*. The 1992 1:1 million compilation map by Card and others does appear in the references, however. In terms of the public audience obviously sought for this guidebook, these are small points: the book does succeed admirably in making the geology of this classic and scenic area available to the public in words and pictures they can understand.

How does this guidebook compare with similar guidebooks elsewhere, such as the *Roadside Geology* and *Geology Underfoot* series of Mountain Press in the United States, as reviewed by Bill Sarjeant in the pages of *Geoscience Canada* from time to time? I'd say favourably: this guidebook is a winner. I can't look at this guidebook with the eyes of a novice, because I've been a geologist for a long time. But I think that it should be a cinch to use for the general public, as well as the earth science community, in travelling through this scenic and important area. Kudos to author Ed Pye and editor Ruth Debicki and to the Ontario Geological Survey for publishing this guidebook. Guidebooks such as this one are a critical means of reaching the public: we need more like this one.