

References

- Bromley, R.G., 1996, Trace fossils: biology taphonomy and applications (2nd ed.): Chapman and Hall, London, 361 p.
- Crimes, T.P., and Harper, J.C., eds., 1970, Trace fossils: Seel House Press, Liverpool, 547 p.

Okanagan Geology

Edited by M.A. Roed and J.D. Greenough

Kelowna Geology Committee, 2005
Sandhill Book Marketing Ltd, Kelowna, BC
 ISBN: 0-96997-952-5
 \$24.95, paperback, 220 p.

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This guidebook is an enlarged and modified version of “*The Geology of the Kelowna Area*” which was published in 1993 and very favourably reviewed ten years ago in this journal (v.22, no.3, p.143). The original lived up to this and other reviews as it became a Canadian best-seller (locally outselling Danielle Steele!) and a model for similar public awareness of science projects elsewhere in Canada. Editors Roed and Greenough are also the major authors but about half of the text is contributed by an expanded Kelowna Geology Committee representing a wide variety of natural history disciplines. Profits from the first book were used to establish the Committee’s Bursary Endowment Fund in earth sciences. This fund is expected to grow with sales of the new edition. Again, the Canadian Geological Foundation leads a long list of the publication’s sponsors.

“Nothing succeeds like success” so the editors of *Okanagan Geology* have maintained the same chapter headings in the same sequence as in the original. Only one, short new chapter has been inserted - it deals with the geology of Okanagan wines. As before, the text begins with a history of geological studies and then introduces readers to geological time, the local geological column and the physiographic divisions of the area. This is a prelude to the interesting and picturesque geology with which the region is blessed. Okanagan bedrock includes the Precambrian Shuswap Complex, remnants of transported(?) Paleozoic/Mesozoic terranes and an abundance of Tertiary volcanic and sedimentary rocks. The Ice Age deservedly receives extensive coverage for many of the pleasing landscapes of the region and Okanagan Lake itself are products of glaciation. The attractive silt bluffs and erosional scarps were formed as

ancestral Lake Penticton drained in distinct intervals. Okanagan Lake, 120 km long and 3.5 km wide, is in a depression carved out by repeated glaciations and partly owes its site to the melting of the last bit of glacial ice. In a sense, it is a gigantic “kettle lake”. Deepest bedrock at the bottom of the lake is 640 m below sealevel so that local bedrock relief exceeds that of the Grand Canyon! Again, the last half of the book is devoted to applications of geoscience and comments on and examples of its relevance to society. Many superbly illustrated, local examples of landslides, floods, building foundation problems, watershed management and mineral deposits history are repeated in the new text. But much new is added to all chapters.

As the editors state in the preface: “Geoscientists are continually making new observations... our views of how Earth arrived at its present state are therefore constantly changing”. So an updated map of the region shows Pennsylvanian/Permian rocks of probable North American origin in place of the far-travelled exotic Mesozoic terrane shown in the earlier book. The section on the plate tectonic origin of the Cordillera has been modified to incorporate the conclusions and cross-section of the Lithoprobe Project. This has led to some modification of the cross-section through the Kelowna Basin. Mount Boucherie, a favourite landmark for tourists and locals because its toppled columnar structures resemble Roman ruins, was given scant description in the earlier book. It has now been mapped in detail by the editors/authors who provide a fascinating, illustrated story of the formation, extinction, burial and final erosion of this Eocene volcano. The columns are now interpreted as dacite pipes that cut through the older rocks in the last stages of volcanic activity.

The Chapter on Mineral Deposits has much added interest, e.g. the site clean-up of Brenda Mines. It operated successfully for 21 years as the lowest grade Cu-Mo mine in the world - terminating with a rock slide in 1990. Following decommission, the owner, Noranda Mining, has spent about \$50 million on closure and reclamation. Its water treatment facility still contributes to the local economy - costing over \$1 million per annum to operate! There is

also a section on the “gems” found in cavities and fractures in Tertiary volcanic rocks, e.g. chalcedony, agate, chert, jasper and opal. Okanagan opal from north-west of Vernon is now the basis of a local industry. Potential collecting spots for gems, minerals and fossil wood are indicated on a map. Finally, there is a section on “Kelowna - Diamond Exploration Capital” for Kelowna is the home and office of famed Charles Fipke who discovered and exploited the Northwest Territory diamonds which still bring wealth and employment to Kelowna and vicinity.

Treatment of Climate Change is much expanded as a result of recent research at the local university and we learn fascinating details of the many fluctuations from Pleistocene times to the present day warming trend. This is a good lead-in to the newly added Chapter on Okanagan wines - many of which have recently earned fine international reputations. History is reviewed, terroir defined and three grape-growing regions identified and their soils, chemistry, drainage and amounts of sunlight described. I predict this new chapter (a labour of love for John Greenough and co-authors) will have a positive impact on tourism because few tourists drive on without a case or two of Okanagan wine aboard.

Remember 2003 - the year British Columbia was afire? Okanagan Mountain Park and the city of Kelowna were much in the news then so the chapter on Geologic Hazards discusses the firestorm in some detail. More than 30,000 Kelowna residents were forced from their homes and many houses were destroyed (apparently including that of editor M. Roed!). The watersheds are hazards in the aftermath of such a fire as the intense heat makes the soils water-resistant for several years and this leads to flash floods and debris flows. Severe erosion and at least one flash flood have taken place since the fire and have damaged roads and buildings.

The chapter on Ancient Peoples has been greatly expanded by a section on archeological sequence. This traces the changes in tools, food and culture from 10,000 years ago up to historical times. Another addition describes the sources of lithic materials used in tools and weapons over the past 9000 years.

The chapter on Geological Landmarks, its accompanying map and two appendices telling how to get to the geological wonders remain virtually unchanged. A third appendix includes a description of the geology of the Myra Canyon section of the long-abandoned Kettle Valley Railway. This famed railway lost 14 of its wooden trestles during the 2003 fire. The hope is that these will be reconstructed for the benefit of hikers, skiers, bikers and railway buffs who come from afar to admire the matchless scenery along the railbed.

Okanagan Geology has 50 percent more illustrations than its predecessor. Several of the new ones, including a spectacular depiction of Layer Cake Hill and its nearby Pinnacle on the book cover, are reproductions of Murray Roed's acrylic paintings. If a good picture is worth a thousand words, Murray's paintings are worth two thousand as his geologist's eye sees through nature.

I found a few flaws, e.g. the Kettle Valley Railway is not numbered to coincide with the location map for Geologic Landmarks, and Bear Creek Park is not listed in the Index, but none serious in this carefully edited, very readable guidebook. It is sufficiently updated and different from the original version that it will probably again be a local bestseller. No travellers through this remarkably scenic part of the country should be without it. If you are not planning a trip through the Okanagan - send a copy as a present to your old aunt who retired there. She'll enjoy it!