

A Traveller's Guide to Geological Wonders in Alberta

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but may be cost effective in the future. An example of near term may be solar-thermal for producing domestic hot water; for medium term are the adaptation of syngas (biomass derived and coal derived); and for a long term example is large scale transmission and distribution of energy using the medium of hydrogen.

The book is a philosophical text. The first part deals with the fruits of geologists' endeavours but the word, geology, does not appear in the index. In brief the book describes the technologies employed in obtaining energy from oil, gas, coal, uranium and water. The organization of the subject is logical and comprehensive. For geologists it would serve as a handbook. The index is inadequate, however. A reader will not find pages quickly – geothermal power indexed for p. 248: the page is blank. One heading is "Geothermal power" on p. 117, but it is not in the index. The index for heat pumps is p. 381-382 but actually it is page 385. Similarly "cold fusion" is not on p. 311 but p. 315.

This book cannot serve as a standard text for geologists but it can be a ready reference for those wanting brief access to almost all aspects of knowledge pertaining to energy. The price is right, especially for the paperback edition.

A Traveller's Guide to Geological Wonders in Alberta

By Ron Mussieux and Marilyn Nelson
Federation of Alberta Naturalists and the Canadian Society of Petroleum Geologists
Calgary, Alberta
1998, 254 p., C\$24.95

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Authors Ron Mussieux and Marilyn Nelson and their illustrator, Dan Magee, are to be congratulated on this splendid guidebook that introduces the reader painlessly and informatively to about 110 geological sites in Alberta. It does this without emphasizing the glorious Rock-

ies at the expense of other parts of the province. As stated in the foreword, the very grandeur of the Rockies comes from contrast with the arid plains, productive parkland, and boreal forests. The influence of geology is found in all these varied landscapes.

The book begins with a geological primer that the authors rightly state is optional reading because each site is fully described in a stand-alone explanatory piece. However, the primer is very well done and will certainly enhance the lay reader's appreciation of site visits. It consists of a sketch map and brief descriptions of the major geological divisions of the province, followed by an introduction to rocks and to the geological column. Extra pages are devoted to some Alberta specialties such as the formation of the Rockies, the development of caves, and the origin of meteorites.

The sites are grouped into six "tourist destination regions" that include both major cities, *i.e.*, Calgary and Edmonton and their environs, the north, the heartland (central Alberta), the Rockies and the south. Each site within these regions is described by two or more pages of text, coloured photographs, a mini-location map and, in most cases, an explanatory diagram, *e.g.*, a cross-section. Most sites chosen are easily accessible. Many can be examined from main roads, others require short drives down secondary roads or walks along trails. A very few in the north can be reached only by plane or boat.

The range and diversity of geological wonders is enormous. Sites in the Rockies naturally include prominent peaks such as Mt. Yamnuska and the McConnell Thrust, Mt. Rundle, the classic Front Range mountain, and Castle Mountain: exemplar of the Main Ranges. They also include features such as the well-known Cadomin Cave, some of the many spectacular waterfalls, rock slides, and turquoise mountain lakes, together with sand dunes on Jasper Lake, the fast-receding (but still very accessible) Athabasca Glacier, and the eye-catching drumlin cluster of Morley Flats. The origin and significance of all of these features are carefully described, and fascinating tidbits of extra information often provided. For example, although I've visited Bow Falls scores of times, I didn't know that the Permian Ishbel Group strata on the steep north bank contained several lay-

ers of phosphate rock. Nor did I know that commercial phosphate deposits are hitherto unknown in Canada so that these occurrences may be a guide to prospecting beyond National Park boundaries.

So, what after the mountains? Naturally the fossil fuel resources beneath the prairie are identified as geological wonders. A myriad of pump jacks (oil donkeys?) keep us informed of present activities and provincial and national monuments and interpretation centres remind us of the recent exciting past: of Turner Valley, Alberta's first major oil strike in 1914, a classic anticlinal trap where flaring depleted gas pressure and prevented recovery of 88 percent of the oil. You can still visit a remnant of that flaring today; of Leduc #1 drill site, a prime example of the reef trap, which ushered in the modern oil and gas era; and of the Pembina Field which offers fine illustrations of "pinch-out" stratigraphic traps but where the prolific but "tight" Cardium sandstone reservoirs make the pump jacks work hard for their rewards.

Before the oil boom, coal mining was a major source of provincial prosperity. The Foothills and Front Ranges mining of semi-anthracite is now only remembered by ruins and interpretation centres. However, the mining of humble bituminous coal from horizontal strata beneath the Prairies continues to feed the furnaces of generating plants that produce much of Alberta's electricity. Such coal seams can be viewed in several places, particularly in the badlands near Drumheller where 139 mines opened and closed over the years.

Drumheller is also home to the famed Royal Tyrrell Museum of Paleontology. To its south is the Dinosaur Provincial Park, designated a World Heritage Site to recognize both its importance as a dinosaur fossil locality and to acknowledge the eerie landforms that characterize this region of badlands. The ancient environment of the dinosaurs and the recent erosion that produced the landforms are particularly well illustrated and described. South again, another site is Devil's Coulee near Milk River where dinosaur nests and eggs can be visited on tours.

The attention of amateur mineral collectors is drawn to crystals of quartz, calcite and feldspar and also to more exotic substances such as petrified wood in quarries near Edmonton,

"pseudo-cubic quartz" on the Red Deer River, and ammolite (the iridescent shell structure of ammonites) along St. Mary's River in the south.

Although there are few igneous rocks in this land of sediments, we are guided to some fine exposures of dykes near Milk River, volcanic rocks along the road through Crowsnest Pass, and Precambrian diabase along the Lake Louise-Jasper Highway.

Gigantic glacial erratics, enormous concretions, colourful mineral springs, deformed mud buttes, mining of an alkaline lake, a famous (and tough!) golf course built on post-glacial blowout dunes, you name it and it's in Alberta and described in this readable, attractive and durably bound guidebook. I found few flaws: only a single typo and a couple of sentences that were cut off in mid-air at the bottom of a page. Alas, several of the photographs, although sharply focussed, were exceedingly dark: unforgiveable in Canada's sunniest province.

Fellow hikers and skiers, members of the geriatric outdoor clubs to which I belong, have passed favourable judgment on the coverage of those sites with which they are familiar. Many have bought the book, others intend to. So I have no hesitation in recommending it to any or all who plan to travel through, in or around Alberta. If you live outside the province and don't contemplate a visit, consider presenting this as a prize or Christmas (or millennial?) gift to a friend or loved one in Alberta, even if s(he) is a geoscientist.

I received my copy as a gift from a junior high science teacher and her students. They worried that, as I am a once-upon-a-time geologist, this might be bringing coals to Newcastle. No fear; I not only carry it with me and consult it on all out of town trips, but it has enticed me to plan our first family holiday to the country north of Edmonton, a region hitherto neglected as we've explored the adjacent mountains of British Columbia. My appetite has been whetted by the descriptions of the Athabasca oil sands, the Peace-Athabasca Delta, and Wood Buffalo National Park and its incredible salt plains. Incidentally, we shall stop going and returning to play 18 holes on the blowout dunes of Wolf Creek golf course!

The Provincial Museum of Alberta deserves hearty thanks from the geoscience community for publishing the

wonders of our science in such an attractive and understandable form. Other funding came from the Federation of Alberta Naturalists, the Edmonton Geological Society, the Canadian Society of Petroleum Geologists, the Canadian Geological Foundation, and the Logan Fund of our own GAC. They all got their money's worth and so can you for \$24.95 by contacting the Museum Bookshop at 12845 102 Avenue, Edmonton Alberta T5N 0M5 (phone (780) 453-9100), or one of the many outdoor activity shops (e.g., MapTown) in Alberta or elsewhere (ask for ISBN 0-7785-0123-X).

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