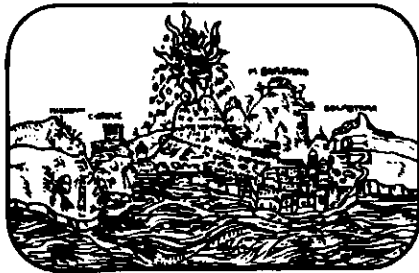


# Features



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## History of Geology

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### Karl Baedeker (1801–1859) and George Dawson (1849– 1901)

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Geology was the fashionable science of the Victorian era. It attracted the attention of people at large in the way that space travel does today, and it occupied the pages of the popular scientific and educational press like biochemistry and sub-atomic physics do in our day. "Geology was the Canadian science *par excellence* in the nineteenth century, as it was in both the United States and Britain, where geology books outsold even novels, ..." (Levere and Jarrell, 1974). Geology was a fit pursuit for gentlemen and even ladies of good breeding could attend illustrated lectures of geological subjects with propriety.

Although there is no record that they ever met, this fashionability brought two giants of the times together: Karl Baedeker, the German publisher of travellers' guidebooks, and George Dawson, the "little giant" of Canadian geology and the third Director of the Geological Survey of Canada.

#### Baedeker and the Guidebooks

Karl Baedeker was born in Essen, in the

Ruhr Valley of Germany, in 1801, the son of Gottschalk Baedeker, a bookseller. There are several conflicting accounts of the events which resulted in the founding of the Baedeker publishing house. A Baedeker guidebook reports that the first guidebook, *Rheinreise von Mainz und Köln*, was published by Professor J.A. Klein in 1828 (Baedeker, 1911). This "was soon taken over by Karl Baedeker..., who himself revised it, issuing a second edition in 1836". Another source suggests that Karl Baedeker originated the guidebook series himself, with a guide to Coblenz (1829) and one for travellers on the Rhine in 1832 (Chambers Encyclopaedia, 1966). Yet other sources claim that the first guidebook, on the Rhine, Belgium and the Netherlands, was published in 1839, by arrangement with the London publishing house of John Murray (Encyclopedia Americana, 1950; Burkart and Medlik, 1981).

Regardless of its precise origins, the publishing venture was highly successful, and resulted in the release of a long series of world-famous travel handbooks in German, French (from 1846 onward) and English (from 1861). In Canada, in 1900, 22 titles were available in English from A.T. Chapman, 2407 St. Catherine Street, Montreal. By 1922, 27 titles were available in Canada in English, with two others available in German only. Baedeker maintained a very high standard in his guidebooks. He is reported, at least in the early years, to have checked their reliability by travelling incognito and by consulting the best sources and experts (Encyclopedia Britannica, 1975). The aim of the guidebooks was to give the traveller the practical information necessary to enable him to dispense with paid guides. After Karl Baedeker's death, the business was carried on and expanded by his sons Ernst, Karl and especially Fritz (1844–1924).

The guidebooks followed a common pattern, with an introductory section about the country or region covered by the book. This was followed by several essays on selected aspects of the region which are of particular value or interest. These covered topics such as language, history, art and architecture, religion, sports and games or

peculiarities of law or government. These essays were written by specialists in the subject and, when guidebooks were translated, new specialists were commissioned to write new essays directly in that language. This section was followed by the main text of the guidebook, describing the country in terms of travel routes with information about transportation, accommodation and meals, health care, and all the sights that the discerning traveller should see.

Baedeker's "Handbook for Canada" was first published in 1894 and sold for \$1.50 (Muirhead, 1894). It was written by Mr. James Fullarton Muirhead, M.A. (1853–1934) under the full title of *The Dominion of Canada with Newfoundland and an excursion to Alaska*. Muirhead also produced Baedeker's other North American guidebook: *The United States, with excursions to Mexico, Cuba, Porto [sic] Rico and Alaska* (Muirhead, 1909). The "Handbook for Canada" included three introductory essays. The first, "The Constitution of Canada" attempted to explain the Federal and Provincial distribution of powers and "The Imperial Connection", and was written by Sir J.G. Bourinot, Clerk of the House of Commons. The second essay, by George M. Dawson, C.M.G., LL.D., F.R.S., Assistant Director of the Geological Survey of Canada, was a "Geographical and Geological Sketch with notes on Minerals, Climate, Immigration and Native Races". The third essay, "Sports and Pastimes", was by W.H. Fuller and E.T.D. Chambers.

#### Dawson's Essay

Canada is described first in terms of its physiography. Dawson divides Canada into three main regions: the Eastern region (including both the Shield and the Appalachians), the Central region of plains and prairies, and the Western region of the Cordillera. The Eastern region is further divided into Shield, Appalachians, St. Lawrence Valley, Frontenac Arch and southern Ontario, with descriptions of geology, drainage, timber industry, fishing, farming and orchards. He then considers the origin of the Great Lakes, and finally he summarizes the geological history of this eastern region from the Archean to the

Paleozoic era. For the Central region, Dawson summarizes the Paleozoic to Mesozoic geological history, describes the Prairie Levels, with a brief reference to glaciation, and concludes with an account of the timberline and farming (not ranching). The description of the Western region covers the Foothills and Rocky Mountains, Coast Ranges, Interior plateaus and mountains and the Pacific Coast. It concentrates on geology, drainage and the C.P.R. route; no mention is made of ranching or lumbering.

There follows a short discussion of Canada's mineral wealth, beginning with fuels. Dawson refers to coal on the east and west coasts, oil and gas in Ontario, brown coal in the Prairies and seam coal and anthracite in the Foothills. Metals mentioned include iron, copper, lead, gold and silver. There is also a brief note on building stone and industrial minerals.

Dawson then describes the climate of Canada, emphasizing the continental nature of western Canada and the maritime character of eastern Canada. The climatic regions are then described and Dawson notes that while the natural regions, based on physiography and climate, run approximately north and south with the general trend of the continent, the border with the United States runs east to west and is "somewhat arbitrary".

In the next section, Dawson discusses "Immigration in Canada", with comments on the importance of the C.P.R. and the opportunities available to farmers and prospectors. The final section of the essay describes the "Native Races", with specific reference to Eskimo, Algonkians, Tinneh (Athabaskans), Huron-Iroquois, Dakota, Salish, Kootanians and the west coast maritime tribes.

In all, Dawson's essay runs to over 30,000 words (Dawson, 1894). It was written at a time when the Geological Survey was a full Department of government, with responsibility for ethnology, anthropology, botanical surveys and museums as well as geology (Blackadar, 1976). During his geological field work in British Columbia, Dawson himself published reports on plants, crustacea, marine invertebrates, meteorology, and surveying techniques as well as ethnography and Indian languages (Alcock, 1947). Thus Dawson, both in his own right and as Assistant Director of the Geological Survey, was eminently qualified to write upon the broad range of topics covered in his Baedeker essay.

#### Revisions and Other Contributions

Baedeker's "Handbook for Canada" went through four editions. The First, described above, was published in 1894, the subsequent ones were published in 1900, 1907

and 1922 (Muirhead, 1894, 1900, 1907, 1922).

Dawson, then Director of the Geological Survey, revised his essay for the Second, 1900, Edition. This revision took the form of minor changes in wording, the updating of coal production statistics from 1892 to 1897 and the addition of a reference to the construction of the Crow's Nest Pass railway. He also added references to gold and silver mining in western Ontario, British Columbia and the Klondike (Dawson, 1900).

Dawson had died by the time Baedeker's Third Edition of the "Handbook for Canada" was published in 1907. (He died, in March 1901, of bronchitis.) His essay was revised for this Edition and again for the Fourth Edition, in 1922, by his friend and protégé Dr. Henry M.I. Ami, the paleontologist, and by Mr. James White, the Dominion Geographer. The revision for the Third Edition included references to Labrador as a dependency of the colony of Newfoundland, the great alluvial deposits of the James Bay basin, irrigation on the prairies, the shipment of coal from British Columbia to smelters in Montana and Idaho, the discovery of petroleum and natural gas in Alberta, the opening of the silver and base metal mining district of Cobalt, Ontario, and the projected extension of the Grand Trunk Railway to the Cobalt district. Ami and White also updated coal production statistics to 1904 and noted that the total value of mineral products for Canada for 1905 was \$68.6 million (Dawson, 1907).

The revisions for the Fourth Edition included a description of the Torngat Mountains, references to the Columbia River, the Rocky Mountain Trench, the C.N.R. and the Yellowhead Railway route through the Rockies. Extensive changes were made to the section on mineral wealth, with the total value of production for 1918 given as \$211.3 million. Additions were made to the descriptions in the section on "Native Races" and the existence and aims of the Department of Indian Affairs were noted. Finally, a table of the "Area and Population of the Dominion according to the Census of 1911" was added. The population was 7,206,643; by 1921, the population of the Dominion was estimated at 8,714,000 (Dawson, 1922).

Dawson also had some influence on, or was used as a resource person for, the writing of the main text of the guidebook. There are occasional references to things geological throughout the text of all the editions. Two examples will be quoted: the first is from the Second Edition:

"Missouri Coteau: the 'Continental Moraine', 'one of the most remarkable results of glacial action in the Dominion', first recognized by Dr. G.M. Dawson, who thought it the deposit of

floating ice along the front of the third prairie steppe." (Muirhead, 1900, p. 212)

The evolution of G.M. Dawson's views on glaciation have been discussed by Elson (1983). The other quotation is from the Fourth Edition:

"The surface of the Isle of Orleans, 250 ft above the level of the St. Lawrence, once formed together with the Fields of Abraham and the plain stretching from Levis towards the S., an unbroken "peneplain", which is still evident from the "sky-line". It was raised up in the mid-Tertiary period after which it was extensively cut up by the river and its tributaries. (Muirhead, 1922, p. 168)

#### Other Essays By Dawson

Dawson's contribution to the Baedeker guidebooks was not his first summary description of the geology of Canada to be published in a popular book. This honour goes to a 32-page piece on "The Dominion of Canada", published in 1885 in the Second Edition of *An American geological railway guide, etc.* by James Macfarlane (Macfarlane, 1885; Legget, 1981).

This was not, however, a narrative description of the physical geography and geology of Canada. This guidebook was in the form of tables listing the geological formations to be found at each station along the railways lines of North America. These tables were accompanied by copious footnotes presenting additional geological information.

Dawson wrote another essay on Canada, similar to his Baedeker essay, in 1897. This was an 8000-word piece on "Physical Geography and Geology", which was included as Chapter 1 in a *Handbook of Canada* published for the meeting of the British Association for the Advancement of Science in Toronto in 1897 (B.A.A.S., 1897). In this work, Dawson describes the general physiography of Canada, its rivers and lakes, and follows this with sections on the Acadian Region, the Lowlands of the St. Lawrence Valley, the Laurentian Plateau, the Interior Continental Plain and the Cordillera. There are also two sections discussing the glaciation of eastern and western Canada.

#### Conclusion

Dawson's essays and the revisions by Ami and White span a period of 37 years, from 1885 to 1922, and present a fascinating picture of the growth of knowledge of the geology of Canada. This was the period just after the Geological Survey had moved from Montreal to Ottawa (1881), and just after what Blackadar has called "The Heroic Age" of the Surveys' explorations of Canada (Blackadar, 1976, p. 10). The scientific exploration of Canada was carried forward through the travels and field work of Dawson himself, A.R. Selwyn (Dawson's

predecessor as Director), and such men as Robert Bell, A.P. Low, J.B. Tyrrell, R.G. McConnell, J.M. Bell and Charles Camsell. The increased knowledge of Canadian geology resulting from their work is reflected in George Dawson's several essays.

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