



SECTION A

History of Geology, Mineral Exploration, and Environmental Damage

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Sudbury, Ontario, is one of at least five “Sudburys” in the world and probably the best known. It was named in 1882 by James Worthington in honor of his wife’s birthplace in England. Mr. Worthington was the construction manager for the Canadian Central transcontinental rail line through the area.

The geological and anthropological histories of Sudbury, Ontario, are complex and fascinating, and some aspects are still being researched. In Table A.1, important milestones from earliest of time until the present are documented. Many of the events are discussed in the following chapters.

Ore was discovered in Sudbury in the 1880s. However, attempts to extract the copper was largely unsuccessful because of the high sulfides and the presence of the “devil’s metal,” nickel. Technology that was developed to recover the metals was not environmentally friendly, and the region suffered deep scars to the landscape from the mining and smelting activity. By the 1950s, Sudbury was famous as the world’s largest producer of nickel and infamous as a region where the landscape has been devastated. Soil and vegetation were lost from tens of thousands of hectares of land surrounding the roast beds and the smelters. The scar was readily visible even from outer space (see Plate 1 following page 182). Decades later, the infamy was extended when it was shown that lakes at a considerable distance were acidified and grossly contaminated with metals. Fortunately, the story does not end there. Recent efforts related to reclamation, including emission reductions, have been positive. The latter chapters in this book demonstrate that, given the will and cooperation, environmental degradation can be abated over the short term.

Sudbury is not alone in its history of environmental degradation caused by mineral smelting. In fact, there are several “sister cities” in Russia where nickel smelting has created similar sites of environmental damage related to sulfur dioxide and metal particulate emissions. It is our hope that this book will provide a useful case history to assess progress toward environmental restoration.

TABLE A.1. Chronology of Important Events Influencing the Sudbury Region

	Time (years since present)
Formation/accretion of earth	4,600,000,000
Oldest known rocks of the Canadian Shield	3,920,000,000
Origin of life	3,400,000,000
Formation of Sudbury Basin	1,850,000,000
Beginning of mountain building period causing deformation of Sudbury Basin	1,800,000,000
End of mountain building period	1,630,000,000
Evolution of modern humans	1,000,000
End of last glaciation and formation of glacial deposits	10,000
Ojibways, Hurons, and Ottawas settle in the area	from 10,000
Evidence of first settlement Sheguindah	from 7,000
First European explorer (Champlain) (1615)	380
Chemical and physical properties of nickel recognized	250
Hudson Bay Trading Post established west of Sudbury Basin (1824)	171
First geological reconnaissance of the north shore of Lake Huron (Logan) (1849)	146
First mapping of mineralization in Sudbury area (1856)	139
Chicago fire exerts demands on Sudbury forests for lumber to rebuild (1879)	116
Discovery of mineralization at Sudbury during construction of transcontinental railway (1883)	112
First purchase of mining lands by Murray (1884)	111
First uses of corrosion resistant nickel steel (1885)	110
First smelting of Sudbury ores by roast heap (1888)	107
Thomas Edison stops exploring just short of discovering Falconbridge deposit (1901)	94
First geological map of Sudbury Basin (1905)	90
Ontario Royal Commission on Nickel (1915)	80
Austenite structure for stainless steel determined by Guillet (1915)	80
Damages by Sulphur Fumes Arbitration Act proclaimed (1921)	74
Founding of International Nickel of Canada Ltd. (Inco) (1928)	67
Formation of Falconbridge Nickel Mines Ltd. (1928)	67
Ontario government issues environmental control orders to reduce emissions from area smelters (1969)	26
First published concerns of long-range atmospheric damage from Sudbury (1970)	25
First Earth Day (1970)	25
Completion of Inco's "Superstack" and major emission controls (1972)	23
U.N. Stockholm conference on the environment emphasizes acidification pollution to lakes (1972)	23
First International Conference on Acid Rain at Ohio State University (1976)	19
Regional land reclamation initiated (1978)	17
Ontario government initiates Countdown Acid Rain program (1985)	10
First published evidence of reversal of acidification, Sudbury lakes (1986)	9
U.N. Local Government Honours Award to Sudbury (1992)	3
Legislated reductions in sulfur dioxide emissions achieved (1994)	1