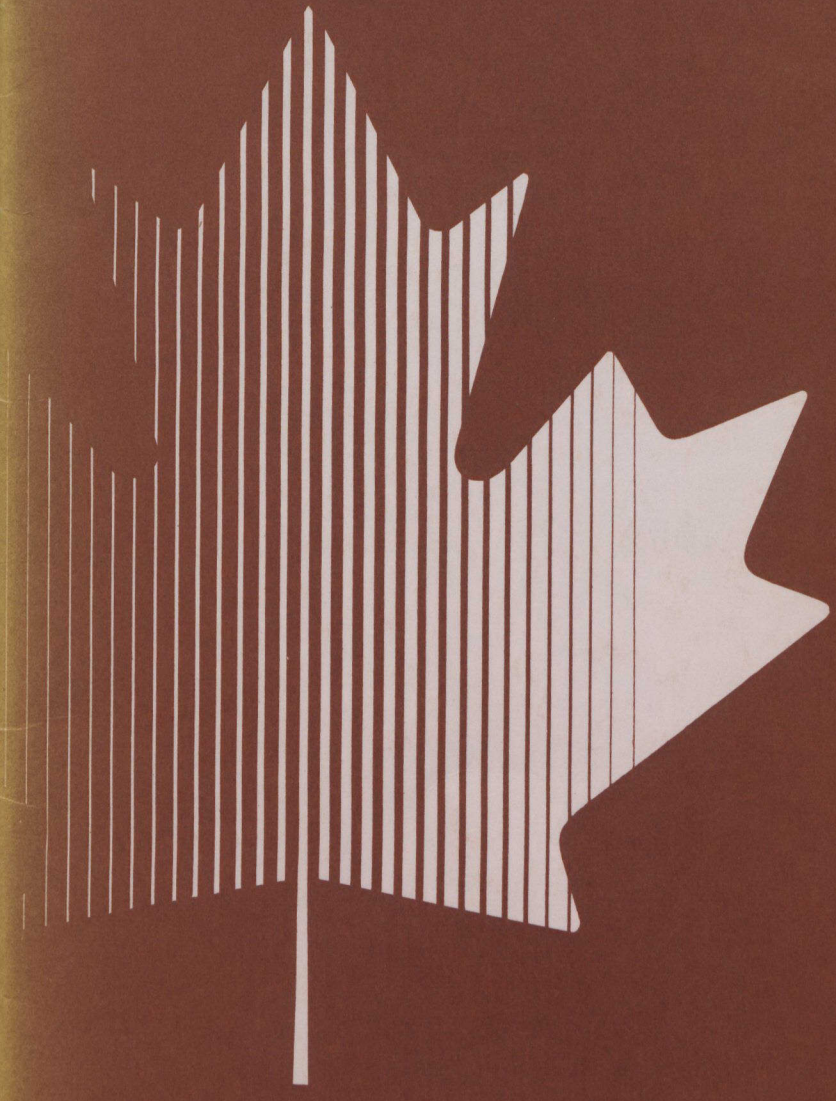
Minerals in Canada



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Minerals in Canada

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Mineral products can be divided into two groups, fuels and non-fuels. This paper discusses the occurrence and production in Canada of non-fuel minerals — metals like nickel and copper, and non-metals such as asbestos and potash.

With the world's second-largest land area, Canada ranks third among all nations in the value and diversity of its non-fuel mineral production. More than 50 commodities are produced from mining activities carried out in every part of the country, from coast to coast and from the southern border to the Arctic islands. In 1976, the total value of these commodities exceeded $7.4 billion. The mining and mineral-processing industries employ more than 140 000 Canadians besides indirectly providing at least another 100 000 jobs.

Canada is a world leader in the volume of its production of many minerals. It is first in nickel, zinc and asbestos; second in potash, sulphur, gypsum, uranium and molybdenum (in the non-Communist world); third in silver, gold and the platinum metals; fourth in copper, aluminum and lead; and sixth in iron ore. The most important of these to Canada in their production value are nickel, copper, iron ore, zinc, aluminum, potash, gold, silver and asbestos.

More than half Canada's non-fuel mineral production is exported to over 90 countries throughout the world. Of this great volume, 66 per cent goes to the United States. Other major customers are the European Economic Community (EEC), which takes 16 per cent, and Japan, which receives nearly 10 per cent. In all, non-fuel minerals account for about 20 per cent of Canada's total exports.

Geological regions of Canada

Canada is divided into five main geological regions — the Canadian Shield, the Interior Plains, the Cordilleran Region, the Appalachian Region and the Innuitian Region.

The Canadian Shield is the country's largest physiographic feature. An enormous expanse of rock, bush and bog, it covers most of Eastern and North-Central Canada in a broad band around Hudson Bay. The Shield, which is one of the most important mining regions in the world, is primarily a source of metallic minerals.

The Interior Plains Region is a vast flatland extending west from the edge of the Canadian Shield to the foothills of the Rocky Mountains. The value of most mineral production in this region is provided by the fossil fuels group, but the production of some non-metals — potash, gypsum and salt — is also important.

The Cordilleran Region is the site of Canada's spectacular western mountain ranges, and covers most of British Columbia and the Yukon Territory. Mines in this region produce a variety of mineral products, including copper, lead, zinc, asbestos and coal.

The Appalachian Region, which lies to the southeast of the Canadian Shield, includes the Atlantic Provinces and part of south-eastern Quebec. Metallic-mineral production in this region includes copper, zinc and lead. The world's major source of asbestos occurs in the Quebec sector of the region.

The Innuitian Region comprises the northern islands of the Canadian Arctic. This remote area is acquiring increasing importance, recent exploration activities having indicated extensive natural gas deposits, as well as deposits of zinc and lead.

Major Canadian minerals

Nickel —

Canada is the largest producer of nickel, supplying about one-third of the world's consumption. All this production takes place in Ontario and Manitoba. The famous Sudbury Basin of Ontario — 63 miles long and ten miles wide — is the largest single source of nickel in the world.

Refined nickel is shipped from Canada to 40 other countries. Major customers are the United States, Britain and other members of the EEC, and Japan.

Copper —

Canada ranks fourth in world production of copper, with average annual mine production exceeding 700 000 tonnes. Major producing areas are in Ontario, British Columbia, Quebec and Manitoba, but some copper mining is also carried out in the Atlantic Provinces, Saskatchewan and the Yukon Territory.

In Canadian mines, copper is frequently associated with other non-ferrous metals such as nickel, zinc, lead and molybdenum. Much of Canadian production comes from deposits in which the average ore-grade is 2 percent copper or less.

About 500 000 tonnes (550 000 net tons) of copper a year are refined in Canada; the balance of production is exported as concentrates, mainly to Japan. Of the copper refined in Canada, more than half is exported, principally to Europe and the United States.

Iron ore —

Canada is one of the major world suppliers of iron ore, ranking sixth in volume of production.

The Labrador area of Newfoundland is Canada's largest source of iron ore, followed by Quebec, Ontario and British Columbia. The average annual production is in the vicinity of 45 million tonnes (49 500 000 net tons), 75 per cent of which is exported to the United States, Britain, Western Europe and Japan.

Zinc —

Canada, the leading producer, accounts for more than 25 per cent of annual world mine production of zinc.

All zinc mined in Canada is produced in association with lead, copper or silver. Major producing areas are Ontario, the Northwest Territories, New Brunswick, the Yukon and British Columbia. Zinc is also mined in Manitoba, Saskatchewan and Newfoundland. Production exceeds one million tonnes annually.

Aluminum —

Canada is the world's fourth-largest producer of aluminum ingot, accounting for about 9 per cent of total the production of the non-Communist world. About 65 per cent of Canadian production is shipped to many countries around the world, more than half these exports going to the United States.

In contrast to other major Canadian mineral products, aluminum is not produced from domestic ores, all the raw material — bauxite

or alumina — being imported. Canada's aluminum smelters are advantageously located near shipping ports and large sources of hydroelectric power. About 75 per cent of smelting capacity is located in Quebec, and the remainder in British Columbia.

Potash —

With an annual production level near 6 million tonnes, Canada ranks second behind the U.S.S.R. in the production of potash, which is used in the manufacture of fertilizer. All Canadian potash mines are in Saskatchewan.

Nearly 70 per cent of Canada's potash is sold to the United States; 26 per cent goes to other countries, and the balance is used by Canada's domestic fertilizer industry. With its high percentage of exports, Canada commands nearly 35 per cent of the international potash trade. In addition to the United States, Canada's chief customers for potash are Japan, Korea, Brazil, China, India and Australia.

Gold —

Canada, the world's third-largest producer of gold, accounts for about 5 per cent of total mine production.

About 52 million grams (1 857 142 troy ounces) of gold are produced annually in Canada; 73 per cent comes from lode-gold mines and placer deposits, and 27 per cent from the treatment of base-metal ores. Gold is recovered in all provinces and territories except Prince Edward Island. The major gold-producing areas are in Ontario, Quebec, the Northwest Territories and British Columbia.

Silver —

With an average annual mine production exceeding 1 244 tonnes (40 million troy ounces), Canada is the world's third-largest producer of silver. The major producing areas are in Ontario, the Yukon Territory, British Columbia and New Brunswick, but significant quantities are also produced in Quebec, the Northwest Territories and Manitoba.

The principal sources of silver in Canada are the base-metal ores, mainly those containing copper, lead, and zinc. Such ores account for about 98 per cent of total silver production, either as a by-product or a co-product. Most of the remaining 2 per cent comes from silver-cobalt ores and lode and placer gold ores.

Appendix I

References

Canada's Mineral Production, Bulletin 26-202. Statistics Canada. Annual. Statistical tables. $0.70. Available from Publications Distribution, Statistics Canada, Ottawa K1A 0T6, Canada.

Canadian Minerals Yearbook. Department of Energy, Mines and Resources. $7.50. Available from the Publishing Centre, Department of Supply & Services, Ottawa K1A 0S9, Canada. An annual review of developments in the minerals industry, with separate chapters on more than 50 commodities and statistical tables, a company index, and a wall map showing principal mineral areas of Canada.

Canadian Mineral Survey. Department of Energy, Mines and Resources. $1.00. Available from Publications Distribution, Mineral Policy Sector, Department of Energy, Mines and Resources, Ottawa K1A 0E4. Annual mineral review and forecast; an abbreviated preview of *Canadian Minerals Yearbook.*

Operators' Lists. Department of Energy, Mines and Resources. Available from the Publishing Centre, Department of Supply & Services, Ottawa K1A 0S9, Canada:

List 1 — *Metal and Industrial Mineral Mines and Processing Plants in Canada,* publication M37-76/1. $3.00.

List 2 — *Metallurgical Works in Canada — Primary Iron and Steel,* publication M37-76/2. $0.75.

List 3 — *Metallurgical Works in Canada — Nonferrous and Precious Metals,* publication M37-76/3. $1.50.

Geology and Canada. Department of Energy, Mines and Resources. Free. General information booklet. Available from the Geological Survey of Canada, 601 Booth Street, Ottawa K1A 0E8.

Remittance, in Canadian funds, should be payable to the Receiver-General of Canada. Prices are subject to change without notice.

Appendix II

Quantity and value of mineral production, 1975-76

Mineral	Unit of Measure	1975		1976P	
		Quantity	Value	Quantity	Value
			($)		($)
Metallics					
Antimony	kg	..	7 368 840	..	7 270 000
Bismuth	kg	156 605	2 646 596	154 000	2 491 000
Cadmium	kg	1 191 674	8 966 605	1 292 000	7 462 000
Calcium	kg	428 288	1 004 674	558 000	1 521 000
Cobalt	kg	1 354 213	12 547 883	1 373 000	11 769 000
Columbium (Cb_2O_5)	kg	1 661 567	6 854 430	1 656 000	6 935 000
Copper	kg	733 825 891	1 030 502 475	747 135 000	1 126 156 000
Gold	g	51 433 113	270 830 389	52 444 000	207 796 000
Indium	g	6 967 179	..	..	..
Iron ore	t	44 892 530	918 064 741	56 902 000	1 241 263 000
Iron remelt	t	..	80 752 988	..	65 086 000
Lead	kg	349 132 526	155 973 115	259 083 000	129 388 000
Magnesium	kg	3 825 697	8 788 248	5 858 000	12 248 000
Mercury	kg	413 676	..	—	—
Molybdenum	kg	13 026 696	71 201 391	14 416 000	91 873 000
Nickel	kg	242 179 944	1 100 522 780	262 492 000	1 232 143 000
Platinum group	g	12 417 099	56 493 077	13 375 000	48 790 000
Selenium	kg	182 385	7 362 269	260 000	9 134 000
Silver	g	1 234 641 625	178 864 088	1 271 732 000	175 128 000

Both refined silver and silver contained in ores and concentrates are exported to many countries. Major customers are the United States, Japan, the Federal Republic of Germany, Belgium-Luxembourg and Britain.

Asbestos —

Canada, providing 40 per cent of the total world supply, is the foremost producer of asbestos, a fibrous mineral with more than 3 000 industrial uses. The world's largest-known asbestos deposit occurs in Quebec, where about 85 per cent of Canadian production is mined. The remaining 15 per cent of Canadian asbestos production comes from British Columbia, the Yukon, Newfoundland and Ontario.

More than 95 per cent of Canada's asbestos-fibre production is exported to approximately 70 countries around the world. The United States is Canada's largest customer, followed by Japan, Britain, the Federal Republic of Germany and France.

Mineral	Unit of Measure	1975		1976p	
		Quantity	Value	Quantity	Value
			($)		($)
Tantalum (Ta_2O_5)	kg	..	..	..	..
Tellurium	kg	19 854	414 074	24 000	529 000
Tin	kg	319 429	2 366 202	275 000	1 873 000
Tungsten (WO_3)	kg	1 477 731	..	..	..
Uranium (U_3O_8)	kg	5 517 128	..	6 058 000	..
Yttrium (Y_2O_3)	kg	..	..	..	..
Zinc	kg	1 055 150 513	872 328 258	1 039 688 000	862 296 000
Nonmetallics					
Asbestos	t	1 055 667	267 246 126	1 549 000	445 523 000
Barite	t	..	2 305 819	..	1 860 000
Diatomite	t	..	..	..	..
Felsdpar	t	—	—	—	—
Fluorspar	t	—	—	..	2 246 000
Gemstones	kg	110 438	414 123	..	414 000
Gypsum	t	5 719 451	20 303 793	5 663 000	22 906 000
Helium	m^3	..	..	..	..
Magnesitic dolomite and brucite	t	..	5 358 214	..	5 116 000
Mica	kg	..	..	..	..
Nepheline syenite	t	468 427	8 869 497	541 000	10 828 000
Nitrogen	m^3	..	..	..	..
Peat moss	t	361 096	22 272 562	363 000	22 500 000

Potash (K_2O)	t	4 673 425	358 569 684	5 126 000	361 442 000
Pyrite, pyrrhotite	t	21 120	127 271	31 000	240 000
Quartz	t	2 491 715	13 112 130	2 376 000	13 895 000
Salt	t	5 122 573	59 714 393	5 752 000	75 691 000
Soapstone, talc pyrophyllite	t	66 029	1 538 116	65 000	1 774 000
Sodium sulphate	t	472 196	22 048 515	490 000	24 878 000
Sulphur in smelter gas	t	694 666	9 640 642	781 000	15 454 000
Sulphur, elemental	t	4 078 780	91 847 393	3 781 000	63 339 000
Titanium dioxide, etc.	t	..	55 811 738	..	74 410 000
Fuels					
Coal	t	25 258 744	586 423 000	25 311 000	604 000 000
Natural gas	'000m^3	87 485 758	1 520 661 000	86 858 171 000	2 466 621 000
Natural gas by-products	m^3	17 834 745	782 337 000	16 543 000	794 325 000
Petroleum, crude	m^3	83 001 381	3 763 934 000	77 843 000	4 128 458 000
Structural materials					
Clay products		..	85 977 084	..	92 110 000
Cement	t	9 965 111	320 172 540	9 850 000	339 159 000
Lime	t	1 601 624	46 906 613	1 825 000	54 099 000
Sand and gravel	t	247 155 421	305 180 621	247 660 000	320 800 000
Stone	t	88 920 782	202 099 302	87 180 000	209 600 000
Total		..	13 346 724 299	..	15 392 839 000

Source: Statistics Canada

p Preliminary; .. Figures not available or not applicable; — Nil

Appendix III

Value of metallics, nonmetallics, fuels and structural materials produced, 1975-76

Year and province or territory	Metallics	Non-metallics	Fuels	Structural materials	Total
			(thousand dollars)		
1975					
Newfoundland (incl. Labrador)	512 262	21 005	—	17 612	550 879
Prince Edward Island	—	—	—	1 787	1 787
Nova Scotia	1	28 822	44 586	27 930	101 399
New Brunswick	197 231	6 253	7 206	20 938	231 628
Quebec	668 296	253 462	8	318 163	1 239 929
Ontario	1 948 966	56 186	11 554	333 300	2 350 006
Manitoba	448 137	4 805	31 445	45 232	529 619
Saskatchewan	18 622	385 955	433 766	23 262	861 605
Alberta	40	100 802	5 569 399	76 330	5 746 571
British Columbia	622 208	49 009	529 802	95 782	1 296 801
Yukon Territory	196 020	32 821	1 310	—	230 151
Northwest Territories	182 070	—	24 279	—	206 349
Canada, 1975	4 793 853	939 180	6 653 355	960 336	13 346 724

Year and province or territory	Metallics	Non-metallics	Fuels	Structural materials	Total
1976[p]					
Newfoundland (incl. Labrador)	699 919	38 699	—	17 389	756 007
Prince Edward Island	—	—	—	1 700	1 700
Nova Scotia	—	32 927	54 500	29 774	117 201
New Brunswick	217 945	6 758	6 383	23 971	255 057
Quebec	765 699	439 174	2	316 446	1 521 321
Ontario	2 153 488	75 742	11 788	353 024	2 594 042
Manitoba	387 330	4 366	32 995	53 429	478 120
Saskatchewan	25 116	392 357	462 612	28 469	908 554
Alberta	—	72 955	6 829 549	93 068	6 995 572
British Columbia	710 487	45 078	567 033	98 498	1 421 096
Yukon Territory	96 009	34 460	600	—	131 069
Northwest Territories	185 158	—	27 942	—	213 100
Canada, 1976 preliminary	5 241 151	1 142 516	7 993 404	1 015 768	15 392 839

Source: Statistics Canada

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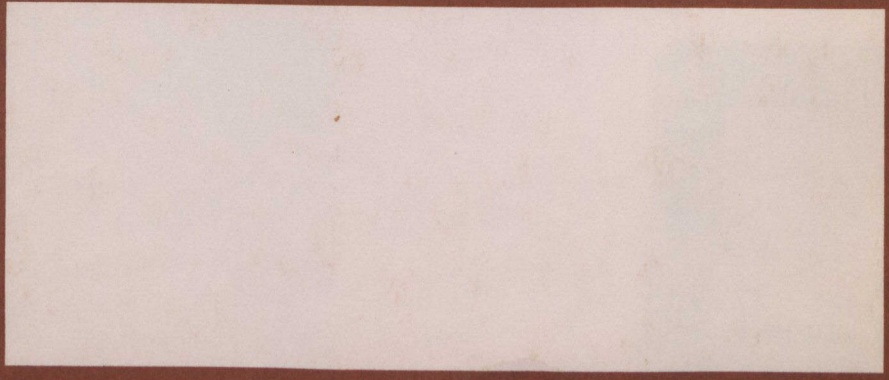

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