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CANADA

THE MISCELLANEOUS METAL MINING INDUSTRY

1961

DOMINION BUREAU OF STATISTICS
Industry Division

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EXPLANATORY NOTES

Establishment

The reporting unit in the Census of Manufactures is the **establishment.** Beginning with the 1961 Census, the establishment is defined as follows:

The smallest unit which is a separate operating entity capable of reporting all the following:

Materials and supplies used,
Goods purchased for resale as such,
Fuel and power consumed,
Number of employees and their pay,
Inventories,
Shipments or sales.

The establishment is to be distinguished from smaller subdivisions or departments which do not have records which permit them to report all items required of an establishment. Prior to 1961, some establishments were required to submit two or more separate reports when they were engaged in operations which were classifiable to different industries. Beginning with 1961, separate reports for such operations will be required only in cases where accounting records can provide all the elements of principal statistics enumerated above. Special reporting arrangements were made with respondents when the acceptance of combined reports would have seriously affected the statistics for particular industries or areas. Where continuity of industry statistics was affected by this change in reporting procedures, adjustments to the data were made back to 1957 in order to maintain comparability of the series for recent years.

A manufacturing establishment is typically a factory, mill or plant principally engaged in manufacturing operations. Prior to 1961, the Census of Manufactures attempted to cover the manufacturing activities of all establishments, whether or not they were principally engaged in manufacturing operations. Beginning with the 1961 Census, establishments (accounting entities) which are not primarily engaged in manufacturing are no longer included as manufacturing establishments in the basic industry statistics. Again adjustments to the industry statistics were made to reflect the removal of such reporting units for the period 1957 - 1960. These reporting units are now listed as establishments in other Bureau industry surveys, such as Wholesale Trade, Construction, etc. In order, however, to maintain complete coverage of certain commodity items produced mainly in manufacturing establishments, many non-manufacturing establishments are now surveyed for commodity shipments only and the latter are included in those tables of industry reports showing shipments of certain commodities "from all industries".

SYMBOLS

The interpretation of the symbols used in the tables throughout this publication is as follows:

.. figures not available.

... figures not appropriate or not applicable.

— nil or zero.

THE MISCELLANEOUS METAL MINING INDUSTRY

1961

Aluminum
Antimony
Barium
Beryllium
Bismuth
Cadmium
Calcium
Cerium
Chromium
Indium
Magnesium
Manganese
Mercury
Molybdenum
Selenium
Tantalum-Columbium
Tellurium
Thallium
Thorium
Tin
Titanium (ilmenite)
Tungsten
Uranium
Vanadium
Zirconium

The mining of certain metal-bearing ores, other than those commonly classified as gold, silver, copper, nickel, cobalt, lead and zinc, have been grouped, for statistical purposes, as a single industry by the Dominion Bureau of Statistics. Their production in some instances is confined to a few operators and the annual extraction of certain types of ores often fluctuates in an erratic manner according to demand and supply. Included in this report, with the statistics relating to the Canadian production of these ores or metals, are notes and statistical data pertaining to various rare or semi-rare metals of metalliferous ores produced in other countries. Metals and metal-bearing ores produced in Canada during 1961 and classified as miscellaneous, include antimony, bismuth, cadmium, calcium, magnesium, molybdenum, selenium, tellurium, titanium ore, tin, tungsten, and uranium. In addition to particulars relating to these metals or minerals, the bulletin contains notes of summary nature on aluminum, beryllium, vanadium and a few of the rarer metals.

It should be noted that some of the metals listed above as Canadian products, and including bismuth, cadmium, selenium and tellurium, represent by-products recovered in the refining of lead, zinc or copper and, for this reason, the statistics of employment, etc., relating to their production in Canada are included with those of either the silver-lead-zinc mining industry, the copper-gold-silver mining industry or the smelting and refining industry.

Since 1955 the data on the iron ore mining industry have been excluded from the Miscellaneous Metal Mining Industry, thus the figures are not directly comparable with those of the preceding years.

Of the 43 active establishments in the Miscellaneous Metal Mining Industry, there were 16 which made shipments of ore or metal-bearing concentrates.

The industry employed an average of 5,919 persons to whom $34,332,063 were distributed as salaries and wages. Fuel cost $3,223,515 and 386,169,109 kwh. of electricity were purchased for $2,633,312. Process supplies, containers, freight and treatment charges amounted to $24,685,868.

TABLE 1A. Principal Statistics of the Miscellaneous Metal Mining Industry, Significant Years, 1921-59

Basis: Standard Industrial Classification in use prior to 1960

Year	Establishments	Employees	Salaries and wages	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of products	Net value added[1]
	number		dollars				
1921	4	44	68,606	45,376	..	230,164	..
1929	8	94	42,837	10,217	..	6,400	..
1931	7	32	25,694	576	..	13,434	..
1933	5	24	14,275	1,178	..	343	..
1937	15	121	155,191	15,668	17,466	86,040	52,655
1939	31	331	455,278	92,405	81,991	524,977	349,404
1941	47	725	1,141,244	359,005	217,494	3,428,886	2,618,483
1944	27	1,385	2,809,013	951,929	657,430	5,360,993	3,303,143
1946	21	1,037	2,338,442	739,531	670,648	7,187,445	3,708,109
1949	21	3,275	8,894,642	1,160,558	1,286,989	21,466,327	15,689,997
1951	31	3,891	12,251,755	1,864,309	3,299,651	31,474,736	21,765,843
1954[2]	180	6,494	24,603,658	3,553,358	10,174,222	83,379,952	66,138,130
1955[3]	223	2,826	12,663,195	1,844,436	4,355,385	35,103.488	28,305,111
1957	139	8,705	42,386,402	6,539,935	6,539,935	144,689,661	115,788,076
1958	91	14,375	78,320,507	9,293,152	50,827,573	284,367,777	223,484,942
1959	84	13,645	76,604,136	9,023,750	57,982,723	333,770,291	265,835,151

[1] Gross value of production, less the value of fuel, electricity, process supplies, containers, freight and treatment charges.
[2] Data for 1954 includes uranium mining which was not shown in preceding years.
[3] Iron ore data excluded since 1955, but included in preceding years.

TABLE 1B. Principal Statistics of the Miscellaneous Metal Mining Industry, 1957-61

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Establishments	Employees	Salaries and wages	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of products	Net value added[1]
	number		dollars				
1957	139	8,705	42,386,402	6,539,935	6,539,935	144,689,661	115,788,076
1958	91	14,375	78,320,507	9,293,152	50,827,573	284,367,777	223,484,942
1959	84	13,645	76,604,136	9,023,750	57,982,723	333,770,291	265,835,151
1960	68	9,380	54,453,208	7,570,803	40,059,514	273,409,628	224,482,268
1961	43	5,919	34,332,063	5,856,827	22,992,059	201,214,250	170,664,295

[1] Gross value of production, less the value of fuel, electricity, process supplies, containers, freight and treatment charges.

TABLE 2. Employees and their Earnings in the Miscellaneous Metal Mining Industry, 1957-61

Year	Employees					Man-hours worked (all employees)	Earnings		
	Office and administrative		Workmen		Total		Office and administrative	Workmen	Total
	Male	Female	Male	Female					
	number						dollars		
1957	1,534	142	6,992	37	8,705	20,072,591	7,145,593	35,240,809	42,386,402
1958	2,314	225	11,818	18	14,375	33,664,766	13,222,817	65,097,690	78,320,507
1959	2,127	230	11,270	18	13,645	29,361,649	13,083,871	63,520,265	76,604,136
1960	1,568	171	7,616	25	9,380	19,037,034	9,795,299	44,657,909	54,453,208
1961	877	102	4,925	15	5,919	12,019,515	5,967,071	28,364,992	34,332,063

TABLE 3. Average Number of Workmen, by Months, 1960 and 1961

Month	1960						1961					
	Surface		Underground	Mill		Total	Surface		Underground	Mill		Total
	Male	Female		Male	Female		Male	Female		Male	Female	
	number											
January	2,368	30	6,027	1,669	5	10,099	1,693	17	2,884	1,009	5	5,608
February	2,251	29	5,691	1,635	5	9,611	1,602	16	2,817	952	5	5,392
March	2,180	25	5,293	1,599	4	9,101	1,557	13	2,788	941	5	5,304
April	2,079	24	4,754	1,394	4	8,255	1,636	13	2,685	943	5	5,282
May	2,034	24	4,464	1,309	4	7,835	1,708	12	2,639	962	5	5,326
June	1,976	20	4,245	1,269	4	7,514	1,732	12	2,444	949	5	5,142
July	1,959	19	3,903	1,177	3	7,061	1,721	10	2,296	901	5	4,933
August	1,821	16	3,973	1,118	3	6,931	1,591	9	2,240	855	3	4,698
September	1,695	14	3,956	1,089	3	6,757	1,520	5	2,081	858	3	4,467
October	1,617	14	3,781	1,001	3	6,416	1,477	4	2,067	842	3	4,393
November	1,557	14	3,778	978	3	6,330	1,445	4	2,087	843	3	4,382
December	1,416	13	3,381	952	3	5,765	1,357	4	2,106	831	3	4,301
Average	**1,914**	**21**	**4,437**	**1,265**	**4**	**7,641**	**1,588**	**10**	**2,429**	**908**	**5**	**4,940**
Man-hours worked						15,845,819						10,073,332

TABLE 4. Fuel and Electricity Used in the Miscellaneous Metal Mining Industry, 1961

Kind		Quantity	Cost at plant
			$
Bituminous coal (a) From Canadian mines	short ton	19	290
(b) Imported	"	82,263	1,169,203
Sub-bituminous coal (from Alberta mines only)		—	—
Anthracite coal	short ton	13	630
Lignite coal		—	—
Coke (for fuel only)		—	—
Gasoline, (includes gasoline used in cars and trucks)	Imp. gal.	322,587	123,210
Kerosene or coal oil	"	35,719	6,714
Fuel oil	"	8,176,255	1,507,862
Wood (cords of 128 cubic feet of piled wood)	cord	4	27
Gas (a) Liquefied petroleum gases (propane, etc.)	Imp. gal.	92,178	13,755
(b) Other manufactured gas		—	—
(c) Natural gas		—	—
Other fuel		—	—
Electricity purchased for power and lighting	kwh.	386,169,109	2,633,312
Electricity purchased for other purposes		—	—
Steam purchased	pound	317,462,700	401,824
Total (cost only)		...	**5,856,827**
Electricity generated (a) For own use	kwh.	90,071,375	...
(b) For sale	"	2,600,000	56,761

ALUMINUM

Although there is no bauxite (the ore of aluminum) in Canada, the aluminum smelting industry in this country is exceeded in size only by that of the United States. The principal factor favouring the establishment of the industry in Canada is abundant and low-cost hydro-electric power at points where necessary raw materials can be cheaply and conveniently assembled.

Producers' output of aluminum ingots in 1961 amounted to 663,173 tons compared with 762,012 tons in the preceding year.

The Aluminum Company of Canada, Limited, operated its alumina plant at Arvida and the reduction plants at Arvida, Ile Maligne, Shawinigan Falls and Beauharnois. The Canadian British Aluminum Company Limited operated a reduction plant at Baie Comeau. All these plants are located in the province of Quebec.

In British Columbia the plant at Kitimat is supplied by power generated at Kemano which is about fifty miles distant. Alumina for the smelter is obtained from Jamaica.

The principal imported raw materials used in the Canadian Aluminum industry are bauxite from British Guiana, coal and coke from the United States, and cryolite from Greenland and the United States.

TABLE 5. Production, Consumption, Imports and Exports of Aluminum Ingots, 1952-61

Year	Production	Domestic consumption	Exports	Imports
	tons (2,000 pounds)			
1952	499,758	90,287	412,589	13
1953	548,445	88,548	459,692	35
1954	557,897	80,355	468,494	115
1955	612,543	91,522	510,631	99
1956	620,321	91,869	508,994	1,405
1957	556,715	77,984	478,670	2,122
1958	634,102	101,886	482,927	11,257
1959	593,630	88,797	505,342	852
1960	762,012	113,000	552,155	501
1961	663,173	127,000	487,034	636

TABLE 6. Imports of Aluminum and Bauxite, 1960 and 1961

Item	1960		1961	
	Tons	Value	Tons	Value
		$		$
Alumina and bauxite, n.o.p.	218,512	5,512,030	177,761	5,028,926
Bauxite ore	2,764,355	39,529,272	2,213,551	52,774,506
Cryolite	8,339	1,387,134	4,033	684,602
Aluminum:				
Pigs, ingots and block	501	431,025	636	484,412
Scrap	1,002	213,940	1,609	326,617
Angles, channels and beams	350	440,560	328	354,868
Bars, rods and wire	673	641,482	720	711,285
Leaf or foil	...	1,219,924	...	1,253,544
Pipes and tubes	357	427,752	347	580,273
Plates, sheets and strips	5,819	5,556,006	7,942	7,594,656
Powder and paste	150	127,147	67	65,400
Wire and cable	177	165,668	190	183,438
Household hollow-ware	...	1,513,829	...	1,337,879
Manufactures, n.o.p.	...	14,948,213	...	15,375,454

TABLE 7. Exports of Aluminum, 1960 and 1961

Item	1960		1961	
	Tons	Value	Tons	Value
		$		$
Aluminum ores, concentrates	..	..	18,876	1,200,639
Aluminum scrap	27,570	9,049,402	29,439	9,433,823
Aluminum in primary forms	552,155	243,034,000	..	..
Aluminum, pigs, ingots, slabs	..	..	487,034	221,526,728
Aluminum, bars, rods, plates	..	..	22,969	13,888,270
Aluminum, semi-fabricated	30,123	16,070,731	..	..
Aluminum foil	131	144,826	147	161,098
Aluminum kitchen utensils	...	38,519	..	..
Aluminum manufactures, n.o.p.	...	1,082,024	..	..
Aluminum fabricated materials, n.e.s.	..	..	11,637	6,248,968

TABLE 8. World Production of Bauxite, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	in thousand long tons[1]				
North America (dried equivalent of crude ore):					
Dominican Republic	—	—	759	678	720[2]
Haiti	263	280	255	268	263
Jamaica	4,643	5,722	5,125	5,745	6,663
United States	1,416	1,311	1,700	1,998	1,228
Totals	**6,322**	**7,313**	**7,839**	**8,689**	**8,874**
South America:					
Brazil	63	69	95	119	140[3]
British Guiana	2,202	1,586	1,674	2,471	2,374
Surinam	3,324	2,941	3,376	3,400	3,351
Totals	**5,589**	**4,596**	**5,145**	**5,990**	**5,865**
Europe:					
Austria	22	23	24	26	18
France	1,663	1,801	1,729	2,006	2,148
Germany West	5	4	4	4	4[3]
Greece	820	843	904	915	1,280
Hungary	893	1,032	942	1,170	1,337
Italy	257	294	290	310	318
Rumania	61	72	70	87	87[3]
Spain	8	8	8	2	—
U.S.S.R.[3]	2,410	2,710	2,950	3,450	4,000
Yugoslavia	874	721	802	1,009	1,213
Totals[3]	**7,013**	**7,508**	**7,723**	**8,979**	**10,405**

See footnotes at end of table.

TABLE 8. World Production of Bauxite, by Countries[1] — Concluded

Country[1]	1957	1958	1959	1960	1961
	in thousand long tons[1]				
Asia:					
China (diasporic)[3]	—	150	300	350	400
India	97	166	215	378	468
Indonesia	238	338	381	389	413
Malaya	326	262	382	452	403
Pakistan	3	2	2	1	1
Sarawak	—	136	207	285	253
Taiwan (Quemoy)	—	—	—	—	—
Totals	**664**	**1,054**	**1,487**	**1,855**	**1,938**
Africa:					
Ghana (exports)	185	207	148	224	193
Guinea, Republic of	360	343	296	1,171	1,739
Mozambique	5	5	4	5	5
Totals	**550**	**555**	**448**	**1,400**	**1,937**
Oceania: Australia	8	7	15	71	18[3]
World totals (estimate)	**20,150**	**21,030**	**22,660**	**26,980**	**29,040**

[1] This table incorporates a number of revisions of data published in previous bauxite chapters. Data do not add to tables shown due to rounding where estimated figures are included in the detail.
[2] United States imports.
[3] Estimate.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TABLE 9. World Production of Aluminum

Country[1]	1957	1958	1959	1960	1961
	short tons[2]				
North America:					
Canada	556,715	634,102	593,630	762,012	663,173
United States	1,647,709	1,565,557	1,954,112	2,014,498	1,903,711
Totals	**2,204,424**	**2,199,659**	**2,547,742**	**2,776,510**	**2,556,884**
South America: Brazil	9,794	13,102	19,950	20,034	20,000[3]
Europe:					
Austria	62,125	62,716	72,271	74,924	74,578
Czechoslovakia	18,400	29,100	28,700	44,000[3]	55,000[3]
France	176,290	186,107	190,712	259,263	307,765
Germany, East	38,100[3]	37,500[3]	38,600[3]	44,000[3]	60,600[3]
West	169,576	150,759	166,631	186,221	190,212
Hungary	27,650	43,560	50,400	54,564	56,328
Italy	72,981	70,603	82,658	92,206	91,881
Norway	105,430	133,777	160,881	181,662	189,487
Poland	22,443	24,738	25,143	28,640	52,488
Spain	16,721	17,769	24,959	26,429	31,085
Sweden, including alloys	14,958	15,113	17,086	18,409	18,436
Switzerland	34,238	34,723	37,886	43,795	46,297
U.S.S.R.[3]	550,000	605,000	690,000	745,000	990,000
United Kingdom	32,933	29,517	27,462	32,390	36,169
Yugoslavia	19,989	23,899	21,214	27,635	30,211
Totals[3]	**1,360,000**	**1,465,000**	**1,635,000**	**1,860,000**	**2,230,000**
Asia:					
China (Manchuria)[3]	22,000	30,000	77,600	88,100	110,000
India	8,718	9,167	19,131	20,123	20,263
Japan	74,934	93,231	110,385	146,864	169,424
Taiwan	9,104	9,455	8,251	9,106	9,938
Totals[1,3]	**114,800**	**141,900**	**215,400**	**264,200**	**309,600**
Africa: Cameroon, Republic of	8,300	35,121	46,644	48,436	52,446
Oceania: Australia	11,899	12,173	12,734	13,054	14,789
World totals[2,1]	**3,710,000**	**3,865,000**	**4,480,000**	**4,985,000**	**5,195,000**

[1] In addition to countries listed, North Korea produced a negligible quantity of aluminum.
[2] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.
[3] Estimate.

Source: "Minerals Yearbook" published by United States Bureau of Mines.

ANTIMONY

Antimony production consists of the antimony content of antimonial lead alloys, varying from 5 to 25 per cent antimony, made by the Consolidated Mining and Smelting Co. of Canada, Limited, at Trail, British Columbia; and antimony in flue dust and Doré slag shipped from that smelter.

The greatest single use for antimony is as an alloying element with lead to which it adds hardness and mechanical strength such as in the manufacture of storage batteries and cable covering. It is alloyed with tin in the manufacture of babbit bearings and with lead and tin in solders, foil, collapsible tubes and type metal. Its property of expansion on cooling when alloyed makes it particularly useful in the manufacture of type metal. During the war it was used to harden the lead used in ammunition and to flame-proof canvas goods used by the armed forces.

The New York price quotations on antimony were 36.25 cents per pound in December, 1961. This price was for grade 99½% in lots of 10,000 pounds or more.

TABLE 10. Production of Antimony, 1952-61

Year	In ores and slags exported		In antimonial lead produced		Total	
	Pounds	Value	Pounds	Value	Pounds	Value
		$		$		$
1952	1,242,840	111,856	1,088,060	489,627	2,330,900	601,483
1953	814,678	40,677	673,418	251,185	1,488,105	291,862
1954	271,350	19,334	1,030,983	329,915	1,302,333	349,249
1955	455,732	38,737	1,565,994	524,608	2,021,726	563,345
1956	331,790	27,373	1,808,642	660,154	2,140,432	687,527
1957	452,184	37,934	908,547	332,508	1,360,731	370,442
1958	—	—	858,633	284,208	858,633	284,208
1959	—	—	1,657,797	540,276	1,657,797	540,276
1960	—	—	1,651,786	538,482	1,651,786	538,482
1961	—	—	1,331,297	469,948	1,331,297	469,948

TABLE 11. Imports of Antimony Metal, by Principal Countries of Supply

Country	1960		1961	
	Pounds	Value	Pounds	Value
		$		$
United Kingdom	353,869	65,624	69,058	14,327
Belgium, Luxembourg	232,195	50,539	33,600	8,918
China	229,642	36,826	550,534	106,938
Yougoslavia	—	—	88,506	23,235
Netherlands	—	—	61,151	12,992
U.S.S.R.	22,074	3,482	24,698	2,651
United States	6,014	1,795	5,000	1,129
Totals	**843,794**	**158,266**	**832,547**	**170,190**

TABLE 12. Consumption of Antimony Metal, 1959-61

	1959	1960	1961
	pounds		
Used in production of:			
Antimonial lead alloys	650,282	576,996	500,877
Babbitt	112,090	113,311	121,417
Solder	21,136	10,518	22,674
Type metal	147,012	100,849	132,667
Other commodities	204,199	150,042	251,284
Totals accounted for	**1,134,719**	**951,716**	**1,028,919**

TABLE 13. World Production of Antimony (Content of Ore), by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	short tons				
North America:					
Canada[2]	680	430	829	761	654
Guatemala (U.S. Imports)	13	47	97	119	71
Mexico[3]	5,734	3,029	3,622	4,662	3,977
United States	709	705	678	637	689
Totals	**7,136**	**4,211**	**5,226**	**6,179**	**5,391**
South America:					
Argentina	—	11	—	—	—
Bolivia (exports)[3]	7,026	5,818	6,065	5,872	7,429
Peru[3]	920	964	793	901	790
Totals	**7,953**	**6,793**	**6,858**	**6,773**	**8,219**
Europe:					
Austria	430	514	631	676	668
Czechoslovakia[4]	1,800	1,800	1,800	1,800[5]	1,800[5]
France	—	42	—	—	—
Italy	224	188	231	340	500
Portugal	11	7	7[5]	—	—
Spain	220	220	180[5]	243	200[5]
U.S.S.R.[4]	5,500	6,600	6,600	6,600	6,600
Yugoslavia (metal)	1,950	1,835	2,514	2,657	2,715
Totals[5]	**10,100**	**11,200**	**12,000**	**12,300**	**12,500**
Asia:					
Burma[3]	70	90	240	180	175
China[5]	15,400	16,500	16,500	19,000	18,500
Iran[6]	110[5]	160	160[5]	33[5]	55[5]
Japan	474	298	340	298	215
Ryukyu Islands	6	—	26	159	112
Thailand	2	—	10	—	36
Turkey	1,232	1,687[7]	1,380[7]	1,507[7]	1,508[7]
Totals[5]	**17,300**	**18,700**	**18,700**	**21,200**	**20,600**
Africa:					
Algeria	1,547	1,106	1,135	785	720
Morocco: Northern Zone	360	203	252	310	400[5]
Rhodesia and Nyasaland, Fed. of:					
Southern Rhodesia	83	151	104	100	68
Union of South Africa	11,021	7,904	13,619	13,538	11,804
Totals	**13,011**	**9,364**	**15,110**	**14,733**	**12,992**
Oceania: Australia	543	775	703	175	131
World totals (estimate)[1]	**56,000**	**51,000**	**59,000**	**61,000**	**60,000**

[1] This table incorporates some revisions . Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.
[2] Antimony content of smelter products exclusively from mixed ores.
[3] Includes antimony content of smelter products derived from mixed ores.
[4] Estimate according to annual issues of *Minerais et Métaux (France)*, except 1961.
[5] Estimates.
[6] Year ended March 20 of year following that stated.
[7] Exports.

Source: "Minerals Yearbook" published by the United States Bureau of Mines .

TABLE 14. Imports of Antimony Oxide, by Principal Countries of Supply, 1957-61

Country	1957	1958	1959	1960	1961
	pounds				
United Kingdom	246,760	184,000	300,000	253,375	170,560
United States	54,937	71,200	80,254	139,476	100,150
Belgium	20,160	67,781	42,714	44,000	44,007
Germany, West	44,090	—	88,184	—	—
France	—	—	—	—	44,000
Totals	**365,947**	**322,981**	**511,152**	**436,851**	**358,717**

BARIUM

The commercial production of barium metal was introduced in Canada by the Dominion Magnesium Limited, at Haley, Ontario, in 1947. There was a small production during the years 1950-61.

The raw material for making barium metal is imported so the output figures are not included in the statistics of Canada's mineral production.

BERYLLIUM

No beryllium ore has been mined since 1941 when some was produced in Renfrew county and stockpiled. In 1950, a carload of this material was shipped to the United States. No shipments were made in 1960.

In Manitoba a little work was done several years ago on beryl showings in pegmatites opened originally for feldspar and lithium minerals in the Winnipeg River and Oiseau (Bird) River areas, but no shipments were reported.

In the Northwest Territories exploration in the area north and east of the Yellowknife gold camp has disclosed numerous occurrences of beryl in pegmatites which also contain lithium minerals and tantalite-colombite. Some of these are considered to be of possible economic interest.

In Quebec scattered occurrences of beryl are known in the La Corne and Preissac townships, Abitibi county, often associated with molybdenite. None of these, however, is believed to be of economic importance.

Beryllium is used chiefly in the form of beryllium-copper alloys, the most important of which contains about 5 per cent beryllium. A beryllium-aluminum alloy containing 5 per cent beryllium is used as a deoxidizer in making aluminum-magnesium products. Straight beryllium metal has only limited applications, notably for the windows of X-ray tubes, where it is used for its transparency to the rays.

Ground beryl is used as a batch ingredient in spark plugs and other ceramic specialties, to which it imparts high electrical and impact resistance and transverse strength. Some is also used in cooking utensil enamels. Consumption for such uses in the United States is estimated at about 100 tons a year.

New York price quotations, at the end of the year, for beryllium ore, f.o.b. mine, were $46 to $48 per unit of BeO, basis 10 to 12 per cent BeO.

TABLE 15. World Production of Beryl, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	short tons				
North America:					
United States (mine shipments):					
Cobbed beryl	521	463	328	244	317
Low grade beryllium ore		42	97	265	805
Totals	**521**	**505**	**425**	**509**	**1,122**
South America:					
Argentina	1,571	1,004	645	739	770[2]
Brazil	1,452	1,314	969	1,870	1,870[2]
Totals	**3,023**	**2,318**	**1,614**	**2,609**	**2,640[2]**
Europe[1]:					
Norway (United States imports)	—	3	4	—	—
Portugal	191	52	41	32	14
Sweden	—	28	41[3]	—	—
U.S.S.R.[2]	110	160	220	220	220
Totals[2]	**300**	**240**	**310**	**250**	**230**
Asia:					
Afghanistan	14	—	—	11	—
India (United States imports)	1,256	600	—	1,000	883
Korea, Republic of	[4]	—	—	—	—
Totals	**1,270**	**600**	**—**	**1,011**	**885**
Africa:					
Congo, Republic of the (formerly Belgian)	1,666	1,063	280	340[2]	440[2]
Kenya	6	4	2	1	1
Malagasy Republic (Madagascar)	299	180	468	701	660[2]
Mozambique	1,870	1,161	1,559	1,649	1,025[2]

See footnotes at end of table.

TABLE 15. World Production of Beryl, by Countries[1] — Concluded

Country[1]	1957	1958	1959	1960	1961
	short tons				
Africa—Concluded:					
Rhodesia and Nyasaland, Federation of:					
Northern Rhodesia	6	13	2	2	—
Southern Rhodesia	572	332	440	539	396
Ruanda-Urundi	106	51	187	310	330[2]
Somali Republic	—	—	—	—	252
South-West Africa	386	247	170	413	7
Uganda	78	86	234	427[2]	500[2]
Union of South Africa	711	464	203	325	192
Totals	**5,700**	**3,603**	**3,548**	**4,756**	**3,470[2]**
Oceania: Australia	442	278	355	213	280[2]
World totals (estimate)[1]	**11,300**	**7,500**	**6,300**	**9,300**	**8,600**

[1] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.
[2] Estimates.
[3] United States imports.
[4] Less than 0.5 tons.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

BISMUTH

Bismuth is recovered from the lead-zinc ores which are smelted at Trail by the Consolidated Mining and Smelting Company of Canada. The silver-cobalt ores of Cobalt, Ontario contain bismuth, which is recovered by Cobalt Refinery. Bismuth metal is a by-product in the smelting of the copper ores at Gaspé, Québec. The Molybdenite Corporation of Canada produces bismuth metal and bismuth salts at Lacorne, Quebec.

Bismuth is too brittle to be used alone, but its alloys have many uses, such as, in the manufacture of sprinkler plugs and other fire-protection devices, electrical fuses, low-melting solder, dental amalgams and tempering baths for small tools. Like antimony, bismuth expands on solidification and retains this property in a number of alloys, and is used in type metal. This group of bismuth-lead-tin-cadmium alloys is used by the airplane and automotive industries to prepare spotting fixtures, to make moulds for electroforming, to fill thin-walled tubing during bending and to spray-coat wooden patterns and core boxes in foundries.

According to the "E & M J Metal and Mineral Markets", the New York price of bismuth December, 1961 was $2.25 per pound, in ton lots.

TABLE 16. Production of Primary Bismuth in all Forms,[1] 1952-61

Year	Pounds	Value	Year	Pounds	Value
		$			$
1952	162,373	347,224	1957	319,941	584,917
1953	117,366	209,557	1958	412,792	771,267
1954	258,675	572,183	1959	334,736	590,212
1955	265,896	572,362	1960	423,827	762,048
1956	285,861	544,900	1961	478,118	957,625

[1] Refined metal from Canadian ores, plus bismuth content of bullion and concentrates exported.

TABLE 17. Imports of Bismuth Metal, Residues and Salts, 1960 and 1961

Country	1960		1961	
	Pounds	Value	Pounds	Value
		$		$
Metallic bismuth:				
Netherlands	6,598	12,723	1,425	2,712
Yugoslavia	—	—	4,409	8,992
United States	1,050	2,319	2,000	4,670
Bolivia	—	—	10,149	8,193
Totals	**7,648**	**15,042**	**17,983**	**24,567**
Bismuth salts:				
United Kingdom	8,164	19,119	12,856	32,644
United States	1,916	6,897	1,551	7,217
Totals	**10,080**	**26,016**	**14,407**	**39,861**

TABLE 18. Consumption of Bismuth Metal, in Canada, 1960 and 1961

	1960	1961
	pounds	
Used in:		
Fusible alloys and solders	31,127	34,484
Other[1]	13,582	8,144
Totals	**44,709**	**42,628**

[1] Pharmaceuticals, chemicals and malleable iron.

TABLE 19. World Production of Bismuth, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	pounds[2]				
North America:					
Canada (metal)[3]	319,941	412,792	334,736	423,827	479,700
Mexico[3]	780,200	417,700	524,700	599,300	600,000[4]
South America:					
Argentina: In ore[4]	47,800	59,000[5]	114,000[5]	350[5]	—
Bolivia[6]	90,600	244,700	487,400	403,600	465,200
Peru[3]	804,800	851,560	737,617	913,106	1,044,980
Europe:					
France (in ore)	99,200	112,400	122,000	120,400	150,000[4]
Spain (metal)	190,500	116,229	53,168	29,875	26,500[4]
Sweden[4]	120,000	110,000	60,000	80,000	80,000
Yugoslavia (metal)	219,805	169,670	200,026	231,582	216,348[4]
Asia:					
China (in ore)	[7]	[7]	[7]	[7]	[7]
Japan (metal)	144,800	168,751	223,187	261,089	287,000[4]
Korea, Republic of (in ore)	240,000	198,000	227,000	317,000	323,000[4]
Africa:					
Mozambique	6,975	2,167	22,100	30,000	31,000
South West Africa (in ore)	670	680	320	310	390[4]
Uganda	2,700	15,030	18,984	6,720	260[4,5]
Union of South Africa (in ore)	145	2,023	526	512	220[4]
Oceania: Australia (in ore)	1,340	2,352	—	—	1,000[4]
World totals (estimate)[1,2]	**5,000,000**	**4,600,000**	**5,100,000**	**5,300,000**	**5,500,000**

[1] United States figure withheld to avoid disclosing individual company confidential data; included in world total. Bismuth is believed to be produced also in Brazil, Germany and U.S.S.R. Production figures are not available for these countries, but estimates are included in the total.

[2] This table incorporates some revisions. Data do not add to totals shown due to rounding where estimated figures are included in the detail.

[3] Refined metal, plus bismuth content of bullion exported.

[4] Estimate.

[5] Exports.

[6] Content in ore and bullion exported, excluding that in tin concentrates.

[7] Data not available; estimate included in total.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

CADMIUM

Cadmium is recovered in Canada as a by-product of the electrolytic refining of zinc. The zinc refineries at Trail, British Columbia, and Flin Flon, Manitoba, both produce metallic cadmium. In British Columbia the greater portion of cadmium is derived from the lead-zinc ores of the Sullivan mine, but also a considerable amount is recovered from the customs ores shipped from various mines in British Columbia and Yukon to the smelter of the Consolidated Mining & Smelting Company of Canada, Limited, at Trail. Cadmium is found in the copper-gold-zinc ores of the Flin Flon deposit on the Saskatchewan-Manitoba boundary.

Cadmium is used mainly in electroplating and in the manufacture of alloys and compounds, the most common use being as a protective coating for steel. To a much lesser extent, it is used in copper alloys. The use of cadmium alloys in motor vehicle bearings and for solders has created a strong demand for the metal. Cadmium is used also in the arts, paints, ceramics and dyeing, etc.

Cadmium is marketed in metallic form, 99.5 per cent pure and better, and as a sulphide. The principal compounds are cadmium sulphide, cadmium oxide, cadmium lithopone and cadmium selenite.

The New York price for commercial sticks of cadmium in December, 1961 was $1.50 per pound.

TABLE 20. Production of Cadmium in all Forms, 1952-61

Year	British Columbia and Yukon		Manitoba and Saskatchewan		Canada	
	pounds	$	pounds	$	pounds	$
1952	834,235	1,835,317	114,352	251,574	948,587	2,086,891
1953	960,288	1,920,576	157,997	315,994	1,118,285	2,236,570
1954	932,184	1,584,713	154,596	262,813	1,086,780	1,847,526
1955	1,727,390	2,936,564	191,691	325,875	1,919,081	3,262,439
1956	2,182,435	3,710,140	156,986	266,876	2,339,421	3,977,016
1957	2,141,782	4,025,821	226,348	384,791	2,368,130	4,025,821
1958	1,413,463	2,148,463	342,587	520,732	1,756,050	2,669,195
1959	1,837,571	2,352,091	322,792	413,174	2,160,363	2,765,265
1960	1,924,362	2,732,594	366,636	520,623	2,357,497	3,347,646[1]
1961	1,050,117	1,680,187	307,757	492,411	1,357,874	2,172,598

[1] Includes production from Quebec ores.

TABLE 21. Exports of Cadmium Metal, 1960 and 1961

Destination	1960		1961	
	Pounds	Value	Pounds	Value
		$		$
United Kingdom	1,030,116	1,371,545	1,374,009	1,616,849
France	—	—	5	104
Sweden	—	—	1	56
Czechoslovakia	—	—	7	140
India	16,653	21,929	4,047	5,876
Australia	—	—	—	—
Brazil	16,976	22,422	6,439	9,048
Netherlands	—	—	—	—
United States	992,581	1,211,372	517,450	707,414
Hungary	5	109	—	—
Japan	2	54	4	119
Totals	**2,056,333**	**2,627,431**	**1,901,962**	**2,339,606**

TABLE 22. Consumption of Cadmium, 1960 and 1961

	1960	1961
	pounds	
Used for		
Plating	173,675	147,326
Solders	12,759	18,574
Other products	3,982	5,076
Totals accounted for	**190,416**	**170,976**

TABLE 23. World Production of Cadmium, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	thousands of pounds[2]				
North America:					
Canada	2,368	1,756	2,160	2,357	2,399
Mexico (refined metal)[3]	—	42	114	179	143[4]
United States (primary and secondary metal)	10,549[4]	9,673[4]	8,602[4]	10,180	9,943
South America: Peru (refined metal)[3]	58	141	141	185	154[4]
Europe:					
Austria	25	25	43	32	32[4]
Belgium	1,323[4]	1,488[4]	1,512[5]	1,583[5]	295[4,5]
France	388	386	539	560	551
Germany, West	611	703	926	902	946
Italy	492	410	552	638	765
Netherlands[4]	77	88	88	88	88
Norway	244	240	234	243	231
Poland[4]	560	573	595	620	640
Spain	20	14	14	26	56[4]
U.S.S.R.[4]	900	975	1,005	1,035	1,100
United Kingdom[6]	228	278	310	236	217
Yugoslavia	57	55	72	84	88[4]
Asia: Japan	873	964	1,082	1,251	1,350[4]
Africa:					
Congo, republic of the (formerly Belgian)	911	1,080	1,047	1,050[4]	419
Rhodesia and Nyasaland:					
Federation of Northern Rhodesia	125	38	—	58	—
Oceania: Australia	880	791	763	662	668[4]
World totals (estimate)[1,2]	**20,800**	**19,800**	**19,800**	**21,700**	**20,100**
Exports:					
Guatemala[3,7]	84	52	—	123	94
Mexico[3]	1,673	1,655	1,151	2,270[4]	2,500[4]
Peru[3]	46	50	29	51	44[4]
South West Africa[3]	2,838	2,698	1,294	1,732	1,747

[1] Data derived in part from bulletins of the World Non-ferrous Metal Statistics and annual issues of Metal Statistics (Metallgesellschaft).
[2] This table incorporates some revisions. Data do not add exactly because of rounding.
[3] In addition to metal refined within the country, cadmium is exported in zinc concentrates, flue dusts, etc., for treatment elsewhere and accounted for in country where smelted. To avoid duplicating figures, these export data are not included in the world total, but are shown separately at end of table.
[4] Estimate.
[5] Exports.
[6] Including secondary.
[7] Recoverable.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

CALCIUM

The commercial production of calcium in Canada started in 1945 when the metal was recovered from lime by Dominion Magnesium Limited, at its plant located at Haley, Ontario. From 1950 to 1955 the value of output was included in the data on magnesium.

Calcium has found increasing use as a deoxidizer in ferrous metallurgy and as an alloy constituent with non-ferrous metals. It has been employed in the reduction of refractory ores of metals, such as chromium, thorium, uranium and zirconium.

TABLE 24. Production (Shipments) of Calcium Metal, 1945-61

Year	Pounds	Value
		$
1945	22,720	19,312
1946	53,548	68,720
1947	602,665	642,607
1948	895,203	1,723,266
1949	520,069	1,040,138
1950-55	[1]	[1]
1956[2]	394,900	515,305
1957[2]	221,225	282,378
1958	25,227	31,256
1959	67,429	76,409
1960	134,801	159,241
1961	99,355	100,881

[1] Not available for publication.
[2] Output.

TABLE 23. Exports of Calcium, by Countries to which Shipped, 1959-61

Country	1959	1960	1961
		dollars	
United Kingdom	36,250	19,201	10,803
Belgium, Luxembourg	9,910	8,980	31,525
Sweden	—	54	—
United States	7,070	14,918	30,439
France	—	155	—
Germany, West	6,325	21,415	10,890
India	14,000	15,870	28,171
Italy	—	661	3,055
Union of South Africa	—	5,850	—
Australia	—	53	—
Japan	—	—	1,958
Totals	**73,555**	**87,157**	**116,841**

CERIUM

A few tons of rock containing cerium and other Rare Earths were shipped from the Parry Sound district to a metallurgical plant in the United States, during 1955. This experimental shipment was valued at $988. No production was reported in 1956-61.

Cerium is obtained from monazite, a monoclinic phosphate of cerium metals containing about 32 per cent cerium oxide (Ce_2O_3) and up to 18 per cent thoria (ThO_2). Monazite is distributed widely in igneous rocks throughout the world, especially in gneisses that have been intruded by pegmatites, but usually it forms only a small fraction of one per cent of the containing rock, and only the natural concentrations in stream gravels and beach sands have paid for exploration. The chief commercial sources of monazite sand are beach deposits in Brazil and India. There are a few occurrences of monazite in Nova Scotia, Quebec and British Columbia, none of which is of commercial interest. It is usually found as small crystals in granites and pegmatites in the Canadian Shield, and small quantities occur in association with the black sands of the Quesnel river, Lillooet district, British Columbia. In the United States there are commercial deposits in Carolina, Florida and Idaho, and known occurrences in many other states.

In Canada, Shawinigan Chemicals, Limited, Shawinigan Falls, Quebec, has been producing cerium products from imported cerium chloride since 1940. The output is sold to the Belgo Canadian Manufacturing Company, Limited, of Montreal, for the manufacture of sparking flints.

CHROMITE

There was no Canadian production of chromite in 1961. This mineral was mined for several years in the Black Lake area in Quebec.

Chromite is one of the principal alloying elements in a great variety of steels, chief of which, in the amount of chromium used, are the stainless and the corrosion-resistant steels. It is used in high-speed tool steels, and as a hard, toughening element in vehicle axles and frames and in aeroplane parts. Chromium in high-temperature alloys is being used for gas turbines, jet-propulsion units and gas engine supercharges. For metallurgical uses chromite should contain a minimum of 48 per cent Cr_2O_3 with a chrome-iron ratio of 3 to 1 or higher and the ore should be hard and lumpy.

Chrome ore is used for making refractory bricks or materials used in basic open-hearth furnaces, in arches of furnaces and in parts of combustion chambers of high-pressure steam boilers, etc. It is used with magnesia to make chrome-magnesia refractories, an important use in Canada being in the manufacture of brucite-magnesia bricks that contain up to 30 per cent Cr_2O_3. Refractory chromite should be fairly high in Cr_2O_3 and alumina, and as low as possible in silica and iron. The ore should be hard and lumpy and not under 10-mesh, and the chromite should be present in an evenly and finely distributed form, not as course grains mixed with blobs of silicate. The Cr_2O_3 content is usually over 40 per cent.

The United States price, December, 1961 for chrome ore, 48 per cent Cr_2O_3, was $32 to $36 per long ton, f.o.b. Atlantic ports.

TABLE 26. Production of Chromite, 1946-61

Year	Short tons	Value	Year	Short tons	Value
		$			$
1946	3,110	61,123	1951	—	—
1947	2,162	42,159	1952	—	—
1948	1,715	33,568	1953	—	—
1949	361	7,148	1954-61	—	—
1950	—	—			

TABLE 27. World Production of Chromite, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	short tons[2]				
North America:					
Cuba	127,126	82,800[3]	43,732[4]	32,774[4]	[5]
Guatemala	1,100[3]	1,168	452	200	110
United States	166,157	143,795	105,000[6]	107,000[6]	82,000[6]
Totals	**294,383**	**227,763**	**149,184**	**139,974**	[5]
South America:					
Brazil	8,748	5,832	6,861	6,245	6,990
Europe:					
Albania	184,000	221,800	272,300	315,300	330,000[3]
Greece	96,172	92,935	88,185	110,200[3]	44,000[3]
Portugal	—	—	—	—	—
U.S.S.R.[3,7]	850,000	880,000	940,000	1,010,000	1,015,000
Yugoslavia	132,570	125,188	117,965	111,170	119,188
Totals[1,3]	**1,280,000**	**1,340,000**	**1,440,000**	**1,580,000**	[5]
Asia:					
Cyprus (exports)	5,678	13,260	13,637	15,702	11,000[3]
India	87,968	70,500	93,936	110,354	50,625
Iran[8]	42,549	38,600[3]	60,600	75,000	55,000[3]
Japan	51,216	46,155	63,578	74,394	77,579
Pakistan	18,114	26,935	17,946	20,265	28,116
Philippines	799,733	458,903	720,345	809,579	705,811
Turkey	1,052,665	631,403	427,324	530,676	443,932
Totals[7]	**2,057,923**	**1,285,440**	**1,397,366**	**1,635,970**	**1,372,063**
Africa:					
Malagasy (Madagascar)	—	—	—	—	9,900[9]
Rhodesia and Nyasaland, Federation of:					
Southern Rhodesia	654,072	618,841	543,104	668,401	590,888
Sierra Leone	17,602	15,944	19,974	6,023	13,200[3,9]
Union of South Africa	733,612	696,057	749,873	850,916	989,718
United Arab Republic (Egypt region)	114	—	275	320	—
Totals	**1,405,400**	**1,330,842**	**1,313,226**	**1,525,670**	**1,603,706**
Oceania:					
Australia	3,415	869	134	592	—
New Caledonia	70,768	52,249	48,463	43,166	40,413
Totals	**74,183**	**53,118**	**48,597**	**43,758**	**40,413**
World totals (estimate)[1]	**5,120,000**	**4,245,000**	**4,355,000**	**4,930,000**	**4,655,600**

[1] In addition to countries listed, Bulgaria and Rumania produce chromite, but data on output are not available; estimates are included in total.
[2] This table incorporates some revisions. Data do not add to totals shown due to rounding where estimated figures are included in the detail.
[3] Estimate.
[4] United States imports.
[5] Data not available; estimate included in total.
[6] Produced for Federal Government only; excludes quantity consumed by American Chrome Company.
[7] Output from U.S.S.R. in Asia included with U.S.S.R. in Europe.
[8] Year ended March 20 of year following that stated.
[9] Exports.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TABLE 28. Imports of Chrome Ores, 1952-61

Year	Tons	Value	Year	Tons	Value
		$			$
1952	148,343	5,146,860	1957	111,453	2,751,372
1953	118,092	3,006,549	1958	38,136	812,286
1954	37,566	571,984	1959	48,678	1,525,438
1955	51,854	971,522	1960	59,023	1,521,812
1956	64,965	1,529,411	1961	71,267	1,908,920

TABLE 29. Imports of Chrome Ores, by Principal Countries of Supply, 1960 and 1961

Imported from	1960		1961	
	Tons	Value	Tons	Value
		$		$
Cyprus	2,822	99,154	3,920	153,556
Rhodesia and Nyasaland	2,155	55,772	5,455	173,004
U.S.S.R.	—	—	—	—
United States	13,343	442,375	22,341	702,159
Union of South Africa	1,132	12,135	4,690	79,633
Philippines	38,912	892,684	34,861	790,568
Cuba	659	19,692	—	—
Malta	—	—	—	—
Totals	59,023	1,521,812	71,267	1,908,920

INDIUM

Indium is recovered by the Consolidated Mining & Smelting Co. of Canada, Limited, from the treatment of zinc refinery residues.

The major use has been in heavy-duty composite metal bearings employed extensively in airplanes, tanks and other mobile equipment. A zinc-indium alloy was used in applying a non-corrosive plating to hollow-steel airplane propellers. Minor uses have been in solder and brazing alloys and alloyed with gold and silver, for jewellery and plated articles. The first commercial used about 1927 was a non-tarnish coating on silverware. Low-melting paint alloys also have been manufactured recently. Indium foil was used as a neutron indicator in the atomic bomb project uranium-graphite piles. Low-energy neutrons, about 1.5 electron-volt, are particularly effective in inducing artificial radioactivity in indium.

At the close of 1961 the quoted price of indium at New York was $1.50 to $2.25 per troy ounce, for lots over 5,000 ounces.

TABLE 30. Production of Indium, 1949-61

Year	Troy ounces	Value	Year	Troy ounces	Value
		$			$
1949	689	1,550	1954	477	1,278
1950	4,952	12,083	1955	104,774	232,598
1951	582	1,368	1956	363,192	795,390
1952	404	909	1957	384,360	693,770
1953	6,752	9,588	1958-61	..	..

MAGNESIUM

Magnesium was produced from dolomite by the Dominion Magnesium Limited, Haley, Ontario. This firm uses the Pidgeon process.

Magnesium is a constituent of aluminum-base alloys that possess high strength and resistance to corrosion. In Canada, this use accounts for the largest quantity. Magnesium finds other applications in cathodic protection of steel structures by magnesium anodes, pyrotechnics, the production of nodular cast iron, and use as a reducing agent in the production of uranium, titanium, beryllium, gerconium and platinum.

Technical information on magnesium is shown in a review published by the Department of Mines and Technical Surveys, Ottawa.

TABLE 31. Production of Primary Magnesium Metal, 1944-61

Year	Quebec		Ontario		Canada	
	Pounds	Value	Pounds	Value	Pounds	Value
		$		$		$
1944	—	—	10,579,778	2,575,695	10,579,778	2,575,695
1945	—	—	7,358,545	1,607,264	7,358,545	1,607,264
1946	—	—	320,677	75,538	320,677	75,538
1947-55	[1]	[1]	[1]	[1]	[1]	[1]
1956	4,572,564	1,536,688	14,639,734	4,543,202	19,212,298	6,079,890
1957	1,585,998	487,853	15,184,373	4,767,043	16,770,371	5,254,896
1958	4,504,343	1,317,070	9,087,362	2,747,755	13,591,705	4,064,825
1959	4,059,508	977,123	8,144,940	2,202,392	12,204,448	3,179,515
1960	—	—	14,577,138	4,313,987	14,577,138	4,313,987
1961	—	—	15,270,618	4,307,570	15,270,618	4,307,570

[1] Not available for publication.

TABLE 32. Exports of Magnesium Metal, 1959-61

Destination	1959	1960	1961
		dollars	
United Kingdom	1,779,079	2,290,382	3,188,691
Union South Africa	2,543	3,975	—
India	23,480	5,540	4,640
Australia	31,559	1,475	86
Austria	5,513	—	—
Belgium	67,397	21,192	1,866
Brazil	16,682	9,821	2,153
Chile	—	—	—
China	63,701	198,761	—
France	183,096	189,612	100,558
Germany W.	1,451,157	87,047	231
Mexico	22,420	320	1,160
Netherlands	20,998	—	—
Sweden	—	140	28,730
Switzerland	55,447	11,840	19,719
Yugoslavia	39,440	29,505	379
United States	86,155	264,716	84,121
Denmark	2,770	—	—
Dominican Republic	8,732	—	—
Greece	383	—	—
Italy	2,544	—	—
Israel	1,008	1,135	14,325
Spain	6,841	6,172	6,590
Uruguay	8,643	2,303	5,992
Czechoslovakia	—	35,768	79,330
Hungary	—	70,425	26,742
Taiwan	—	607	—
Argentina	—	1,782	—
Jamaica	—	287	—
Poland	—	—	43,210
Totals	**3,879,588**	**3,232,805**	**3,608,523**

TABLE 33. Consumption of Magnesium Metal, 1960 and 1961

	1960	1961
	tons (2,000 pounds)	
Used for		
Castings	158	395
Extrusions (shapes and tubing)	230	251
Aluminum alloys	1,339	1,604
Other products	472	526
Totals accounted for	**2,199**	**2,776**

TABLE 34. World Production of Magnesium Metal, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	short tons[1]				
Canada	8,385	6,796	6,102	7,288	7,740
China	[3]	1,100[2]	1,100[2]	1,100[2]	1,100[2]
France	1,753	1,897	1,938	2,359	2,288
Germany, West	330	660	550	330[2]	330[2]
Italy	4,170	4,607	4,960	6,003	6,100[2]
Japan	472[4]	1,106[4]	1,724[4]	2,363[5]	2,400
Norway	9,504	10,132	10,567	11,373	16,500[2]
U.S.S.R.[3]	18,800	19,400	22,000	27,600	34,000
United Kingdom	3,831	2,691	2,387	4,119	4,200[2]
United States	81,263	30,096	31,033	40,070	40,745
Totals (estimate)[1]	**128,700**	**78,500**	**82,400**	**102,600**	**115,400**

[1] This table incorporates a number of revisions of data published in previous magnesium chapters. Data do not add to totals shown due to rounding where estimated figures are included in the detail.
[2] Estimate.
[3] Data not available; estimate included in total.
[4] In addition, the following amounts of remelted magnesium were produced: 1957, 1,906 short tons; 1958, 2,567 short tons; 1959, 2,694 short tons; and 1960, 3,327 short tons.
[5] Primary metal and remelt alloys.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

MANGANESE

Production of manganese ore in Canada has been spasmodic due to the limited number of known deposits. During 1956 a small shipment of manganese bearing silica was exported from British Columbia. During recent years in New Brunswick extensive development work was done by Strategic Materials Corporation on the manganese-iron deposits. Test lots of ores were shipped to the firm's pilot plant where a process was developed for the production of ferro-manganese. Operations have not progressed beyond the experimental basis.

Most of the imported ore is used in making addition agents for steel manufacturing. High-grade manganese dioxide is used in making dry cell batteries. Manganese compounds are used in the glass, enamel, paint and rubber industries. Price quotations of manganese ore, basis 48% Mn, were $0.87 to $0.90 per long ton unit, c.i.f. U.S. ports.

TABLE 35. Production of Manganese Ore, 1943-61

Year	Tons	Value	Year	Tons	Value
		$			$
1943	48	985	1949	—	—
1944	—	—	1950	—	—
1945	—	—	1951	—	—
1946	—	—	1952-55	—	—
1947	225	7,875	1956	...	1,900
1948	3	88	1957-61	—	—

TABLE 36. Imports of Manganese Ore, 1952-61

Year	Tons	Value	Year	Tons	Value
		$			$
1952	194,405	8,273,722	1957	131,318	7,519,746
1953	66,682	2,719,863	1958	42,060	1,722,965
1954	48,962	2,277,043	1959	118,454	5,017,112
1955	175,282	7,338,269	1960	56,350	2,543,763
1956	207,977	9,137,278	1961	76,016	3,465,313

TABLE 37. Imports of Manganese Ore, by Principal Countries of Supply, 1957-61

	1957	1958	1959	1960	1961
	tons				
From					
China	—	10,312	—	—	—
Congo, Republic of (formerly Belgian)	30,081	2,379	5,777	17,032	—
Japan	—	—	3	4	83
Cuba	118	4,782	—	—	—
Ghana	62,916	2,362	66,246	22,399	25,484
India	19,634	6,702	12,314	—	13,291
France	2	2	1	4	13
United States	3,713	11,044	13,887	4,345	6,388
United Kingdom	118	112	111	44	44
Brazil	9,798	—	20,115	6,522	16,785
Mexico	—	1,344	—	512	—
Turkey	—	—	—	—	—
Union of South Africa	4,838	3,020	—	5,488	13,928
Greece	—	1	—	—	—
Total imports	**131,318**	**42,060**	**118,454**	**56,350**	**76,016**

TABLE 38. World Production of Manganese Ore, by Countries[1]

Country[1]	Per cent Mn.	1957	1958	1959	1960	1961
		short tons[2]				
North America:						
Cuba	36-50+	160,967[4]	74,636[4]	58,806[4]	17,644[5]	46,000[3,4]
Mexico	30+	220,000[3]	187,400[3]	181,900[3]	171,400[3]	155,900[3]
Panama	44+	2,154	4,489	—	—	—
United States (shipments)	35+	366,334	327,309	229,199	80,021	46,088
Totals		**749,455**	**593,834**	**469,905**	**269,065**	**247,988**
South America:						
Argentina	30-40	11,154	16,431	21,358	24,250	22,000[3]
Brazil	38-50	1,011,939	972,413	1,138,649	1,101,387	1,100,000[3]
British Guiana	40	—	—	—	137,454	216,203
Chile	40-50	59,724	42,061	42,744	50,594	38,580
Peru	40+	16,917	3,242	1,262	1,905	1,850
Venezuela	38+	32,930	9,039	3,955	—	—
Totals		**1,132,664**	**1,043,186**	**1,207,908**	**1,315,590**	**1,378,633**
Europe:						
Bulgaria	30+	89,600	31,306	28,660	30,900[3]	30,900[3]
Greece	35+	17,545	22,046	38,580	38,580	38,600[3]
Hungary	30+	178,600	200,400	170,100	135,900	132,000[3]
Italy	35+	51,976	48,588	57,138	51,709	51,749
Portugal	35+	6,035	5,485	7,703	8,197	7,700[3]
Rumania	35	292,402	220,755	216,910	192,870	220,000[3]
Spain	30+	45,622	40,267	44,924	24,586	15,000[3]
U.S.S.R.[6]	—	5,674,700	5,915,000	6,080,300	6,472,800	6,500,000[3]
Yugoslavia	30+	4,400[3]	11,060	8,900	14,700	15,600
Totals[1]		**6,360,880**	**6,494,906**	**6,653,215**	**6,970,282**	**7,012,000[3]**
Asia:						
Burma	35+	506	1,405	606	324	196
China[3]	—	770,000	935,000	1,100,000	1,380,000	1,100,000
India	35+	1,852,701	1,406,652	1,308,919	1,267,657	1,338,200
Indonesia	35-49	59,388	48,909	47,172	12,066	14,330
Iran[7]	36-46	2,205	660	2,425	2,400[3]	5,500[3]
Japan	32-40	318,497	326,269	383,699	355,696	26,695[3]
Korea, Republic of	30-48	3,533	287	496	1,521	1,518
Malaya	60	—	—	—	3,222	7,130
Pakistan	42	—	—	32	198	379
Philippines	35-51	33,324	24,590	38,365	19,159	20,547
Portuguese India	32-50	161,347	86,078	83,584	118,195	110,000[3]
Thailand	40+	381	1,100	452	582	588
Turkey	30-50	62,522	24,920	39,341	31,112	33,069
Totals[3]		**3,264,000**	**2,856,000**	**3,005,000**	**3,235,000**	**2,958,000**
Africa:						
Angola	38-48	23,518	38,499	39,314	25,728	22,695
Bechuanaland	50+	243	14,213	20,507	13,912	31,737
Congo, Republic of the (formerly Belgian)	48+	404,572	372,741	425,694	412,154	344,185[3]
Ethiopia	51	—	—	1,500[3]	10,202	7,716
Ghana (exports)[8]	48	713,757	574,124	577,694	600,261	431,580
Ivory Coast	48	—	—	—	68,343	109,526
Morocco Northern Zone	50	732	—	—	—	—
Southern Zone	35-50	541,772	452,041	518,711	532,508	629,512
Rhodesia and Nyasaland, Federation of:						
Northern Rhodesia	30+	39,703	49,383	57,986	64,298	58,907
Southern Rhodesia	48+	1,785	2,512	2,126	1,676	205
South West Africa	45+	89,661	103,049	49,442	67,439	50,295
Sudan[3]	36-44	8,800	6,600	440	—	—
Union of South Africa	40+	787,878	934,097	1,069,196	1,316,124	1,562,718
United Arab Republic (Egypt region)[9]	57	10,315	48,730	67,318	22,046	2,272
Totals		**2,662,736**	**2,595,989**	**2,829,928**	**3,134,691**	**3,251,348**

See footnotes at end of table.

TABLE 38. World Production of Manganese Ore, by Countries[1] — Concluded

Country[1]	Per cent Mn.	1957	1958	1959	1960	1961
		short tons[2]				
Oceania:						
Australia	45-48	86,153	66,845	100,241	68,082	75,810
Fiji	40+	38,858	20,503	14,566	13,073	3,808
New Zealand	48+	41	116	114	134	132
Papua	—	—	—	—	54	—
Totals	...	**125,052**	**87,464**	**114,921**	**81,343**	**84,810**
World totals (estimate)[1]	...	**14,755,000**	**13,671,000**	**14,281,000**	**15,006,000**	**14,933,000**

[1] In addition to countries listed, Czechoslovakia and Sweden report production of manganese ore, but because the manganese content averages less than 30 per cent, the output is not included in this table. Sweden averages annually 11,000 tons and Czechoslovakia approximately 175,000 tons.
[2] This table incorporates a number of revisions of data published in previous Minerals Yearbook manganese chapters. Data do not add to totals shown due to rounding where estimated figures are included in the detail.
[3] Estimate.
[4] Exports.
[5] United States imports.
[6] Grade unstated. Source: The Industry of the U.S.S.R. Central Statistical Administration.
[7] Year ending March 20 of year following that stated.
[8] Dry weight
[9] In addition to high-grade ore shown in the table, Egypt produced the following tonnages of less than 30 per cent manganese content: 1957, 83,957; 1958, 74,303; 1959, 72,752; 1960, 282,200 and 1961, 304,663.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

MERCURY

There was no production in 1961 but in 1955 a small quantity of mercury was produced in the Bridge River district of British Columbia. Previous production had been prior to September, 1944. All of the Canadian production in the past came from the Pinchi mine of the Consolidated Mining and Smelting Company of Canada, Limited, and from the Takla mine of Bralorne Mines Limited, both mines being in the Omineca mining division, British Columbia.

The New York price quotations on mercury during 1961 were $209 per flask of 76 pounds in January; $206 in April; $195 in July and $190 in December.

TABLE 39. Production of Mercury, 1940-61

Year	Pounds	Value	Year	Pounds	Value
		$			$
1940	153,830	369,317	1944	735,908	1,210,375
1941	536,304	1,335,697	1945-54	—	—
1942	1,035,914	2,943,807	1955	75	250
1943	1,690,240	4,559,200	1956-61	—	—

TABLE 40. Production of Mercury, Consumption, Imports and Exports, 1952-61

Year	Production	Consumption	Imports	Exports
	pounds			
1952	—	159,216	144,439	1,500
1953	—	191,976	196,412	7,018
1954	—	193,894	244,783	6,310
1955	75	416,632	555,526	3,781
1956	—	212,800	450,006	5,953
1957	—	215,300	400,710	1,425
1958	—	151,021	197,073	2,830
1959	—	161,987	141,219	10,458
1960	—	139,627	243,091	1,918
1961	—	150,588	312,913	..

TABLE 41. Imports of Mercury, from Countries of Supply, 1960 and 1961

From	1960		1961	
	Pounds	Value	Pounds	Value
		$		$
Mercury metal				
Colombia	—	—	6,840	15,291
United Kingdom	1,610	4,000	24	76
Chile	17,404	46,271	—	—
Mexico	33,382	79,724	29,260	71,752
Netherlands	—	—	57	207
Yugoslavia	—	—	65,620	171,656
Spain	121,600	285,114	123,863	280,687
United States	32,429	90,233	87,249	233,495
Italy	36,666	88,105	—	—
Totals	**243,091**	**593,447**	**312,913**	**773,164**
Mercury salts				
United Kingdom	...	6,316	...	1,845
United States	...	599	...	1,338
Germany West	—	—	...	581
Totals	...	**6,915**	...	**3,764**

TABLE 42. Consumption of Mercury by Principal Uses, 1957-61

Industry	1957	1958	1959	1960	1961
	pounds				
Pharmaceuticals and fine chemicals	4,560	6,057	10,319	11,888	18,258
Heavy chemicals	194,636	137,161	116,011	86,649	96,362
Electrical apparatus	12,312	3,969	4,211	2,962	3,129
Gold mines[1]	3,000	3,000	3,628	4,904	4,086
Miscellaneous[1]	836	834	27,818	33,224	28,753
Total accounted for	**215,300**	**151,021**	**161,987**	**139,627**	**150,588**

[1] Estimated.

TABLE 43. World Production of Mercury, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	flasks of (76 pounds) 34.5 kilograms[2]				
North America:					
Mexico	21,068	22,556	16,420	20,114	18,507[3]
United States	34,625	38,067	31,256	33,223	31,662
South America:					
Chile	678	3,343	2,007	2,876	2,900[3]
Colombia	99	203	95	89	100[3]
Peru	411	1,983	2,526	3,034	2,700[3,4]
Europe:					
Austria	6	—	—	—	—
Czechoslovakia[5]	725	725	725	725	725
Italy	63,237	58,712	45,833	55,463	55,434
Rumania	394	353	387	413	400[3]
Spain	54,750	55,382	51,680	53,369	50,000[3]
U.S.S.R.[3]	25,000	25,000	25,000	25,000	25,000
Yugoslavia	12,328	12,270	13,344	14,069	15,954
Asia:					
China[3]	17,000	17,000	23,000	23,000	26,000
Japan	4,859	5,720	5,988	5,791	5,300[3]
Philippines	3,363	3,321	3,520	3,086	3,000[3]
Turkey	720	1,486	1,321[4]	1,339	1,300[3]
Africa:					
Tunisia	—	39	198	166	80[3]
World totals (estimate)	**240,000**	**246,000**	**233,000**	**242,000**	**240,000**

[1] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.
[2] 76 pound flasks.
[3] Estimate.
[4] Exports.
[5] Estimate according to the 47 Annual issue of Metal Statistics. (Metallgesellschaft), except Czechoslovakia 1961.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

MOLYBDENUM

The principal producer in Canada was the Molybdenite Corporation of Canada Limited at Lacorne, Quebec. The ore is molybdenum disulphide containing some bismuth minerals which are recovered as by-products. The roasting plant at Lacorne produces molybdic oxide. The firm also produces lubricant-grade molybdenum disulphide.

Molybdenum has a widening range of uses, but by far the greater part of the output is used in steel to intensify the effect of other alloying metals, particularly nickel, chromium, and vanadium. These steels usually contain from 0.15 to 0.4 per cent molybdenum, but in some instances the percentage is considerably higher. For high-speed tool steels as much as 9 per cent is added.

Molybdenum alloys are used widely for the hard-wearing and other important parts of aeroplanes. They are used in the automobile industry; in heat and corrosion-resistant alloys, — and to some extent in high-speed tool steels. Molybdenum is used in cast iron and in permanent magnets. Much molybdenum wire and sheet is used in the incandescent lamp and in the radio industries, in new alloys suitable for electrical resistance and contacts, and for heating elements containing molybdenum. An appreciable amount of molybdenum is used in the glass industry in which heavy sheets of the metal act as electrodes to conduct the current through the molten glass in the electric furnaces.

TABLE 44. Production of Molybdenum, 1952 - 61

Year	Ores, concentrates, sulphides and oxides, shipped[1] or used		Total No. contents of shipments
	tons	$	pounds
1952	331	409,831	303,578
1953	184	215,527	194,344
1954	411	457,912	451,450
1955	762	823,954	833,506
1956	705	955,828	842,263
1957	633	1,166,557	783,739
1958	744	1,152,838	888,264
1959	658	748,566	940,596
1960	649	1,015,380	767,621
1961	640	1,092,201	771,358

[1] Shipped from stockpile.

TABLE 45. World Production of Molybdenum in Ores and Concentrates, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	thousands of pounds[2]				
Australia	2	4	[3]	—	—
Austria	—	—	—	—	—
Canada	785	888	747	767	765
Chile	2,998	2,972	3,785	4,440	3,699
China[4]	[5]	2,200	3,300	3,300	3,300
Japan	600	692	793	840	827
Korea, Republic of	31	68	49	97	71
Mexico	29	57	57	132	7[4]
Norway	397	483	498	542	550[4]
Peru	—	2	—	—	—
Philippines	—	—	123	150	220[4]
Portugal	18	—	—	—	—
Union of South Africa	13	9	—	—	—
U.S.S.R.[4]	9,300	9,300	9,900	11,000[5]	11,900
United States	60,753	41,069	50,956	68,237	66,563
Yugoslavia	4	4	4[4]	—	—
World totals (estimate)[1]	**76,200**	**57,700**	**70,300**	**89,500**	**87,900**

[1] Molybdenum is also produced in North Korea, Rumania and Spain, but production is negligible.
[2] This table incorporates some revisions. Data do not add to totals shown due to rounding where estimated figures are included in the detail.
[3] Less than 500 pounds.
[4] Estimate.
[5] Data not available; estimate included in total.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

SELENIUM

The occurrence of selenium is fairly widespread throughout the world, but it is of commercial importance only in its association with copper-sulphide ores from which it is recovered as a by-product in the refining of copper. A variety of uses have been developed for the metal, but relatively small quantities are involved. In Canada refined selenium and certain selenium salts are produced and most of the output is exported.

Canadian production of selenium is obtained from the refineries of The International Nickel Company of Canada, Ltd., at Copper Cliff, Ontario, and Canadian Copper Refineries, Ltd., at Montreal East, Quebec. At Copper Cliff the metal is derived from International Nickel's copper-nickel ores. The plant has a demonstrated capacity of 270,000 pounds of selenium a year and is probably capable of a larger production. At Montreal East selenium is recovered from the treatment of copper anodes made from the copper-gold ores of Noranda, and Gaspé, Quebec and from blister copper from the copper-zinc ores of Hudson Bay Mining and Smelting Co. Ltd., on the Manitoba-Saskatchewan boundary. The Montreal East plant has an annual rated capacity of 450,000 pounds of selenium, which is larger than any other selenium plant in the world. This plant also produced selenium dioxide, sodium selenate and sodium selenite.

Selenium is generally marketed as amorphous powder, but cakes and sticks are also obtainable. Other selenium products marketed are ferro-selenium, sodium selenate, sodium selenite, selenious acid and selenium dioxide. No figures are available to show the relative consumption of selenium by uses. The most important uses are in the glass, rubber and paint industries, but many new uses have been developed as a result of research. Among the more interesting of the latter is the use of selenium in electrical dry plate rectifiers for radar equipment and aircraft generators. Its use in rectifiers for numerous electronic devices, battery charging, electroplating and welding has been increasing.

In the manufacture of glass, selenium is used to neutralize the green colour caused by iron impurities. When sufficient selenium is added the glass turns a ruby colour highly suitable for stop lights. In the manufacture of rubber, the addition of selenium, in concentrations of from 0.1 to 2.0 per cent, promotes resistance to heat, oxidation and abrasion. It is also used as an accelerator in the vulcanization of synthetic rubber.

The New York price for selenium in December 1961 was $5.75 per pound for commercial grade to $6.75 per pound for high purity grade.

TABLE 46. Production[1] of Selenium, 1952-61

Year	Pounds	Value	Year	Pounds	Value
		$			$
1952	242,030	786,599	1957	321,392	3,535,312
1953	262,346	1,101,854	1958	306,990	2,302,426
1954	323,529	1,617,645	1959	368,107	2,576,749
1955	427,109	3,203,319	1960	521,638	3,651,466
1956	330,389	4,460,252	1961	430,612	2,798,978

[1] Includes some recoverable selenium in blister copper not necessarily recovered in the designated year.

TABLE 47. Refinery Output of Selenium from Primary and Scrap Materials, 1952-61

Year	Pounds	Year	Pounds
1952	254,478	1957	332,011
1953	307,903	1958	342,141
1954	297,479	1959	372,410
1955	422,588	1960	524,659
1956	355,024	1961	422,955

TABLE 48. Exports of Selenium and Selenium salts, 1960 and 1961

Destination	1960		1961	
	Pounds	Value	Pounds	Value
		$		$
United Kingdom	213,532	1,601,638	212,500	1,413,520
Union South Africa	3,400	25,330	3,800	23,588
Australia	3,710	34,398	1,100	8,400
Argentina	3,590	22,767	3,000	18,401
Brazil	3,137	23,872	2,000	12,149
France	110	1,040	7,100	53,156
Italy	3,527	33,111	1,500	9,885
United States	125,912	744,322	100,100	618,945
Hungary	1,135	8,118	7,000	46,080
India	278	1,967	300	402
China	30,547	196,592	—	—
Japan	15,432	102,622	100	138
Trinidad	100	630	—	—
Spain	—	—	100	664
Hong Kong	—	—	100	504
Malaya	—	—	400	2,241
China, Communist	—	—	6,100	39,651
Philippines	—	—	200	1,163
Chile	—	—	400	2,615
Totals	**404,410**	**2,796,407**	**345,800**	**2,251,502**

TABLE 49. World Production of Selenium, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	pounds				
North America:					
Canada	321,392	306,990	368,107	562,272	469,892
Mexico	175,475	107,576	8,891	6,944	4,409
United States	1,060,000	683,000	728,000	539,000	1,022,000
South America:					
Argentina	[2]	[2]	[2]	[2]	[2]
Peru	6,865	8,419	8,155	10,681	16,305
Europe:					
Belgium-Luxembourg (exports)	24,471	48,942	124,560	72,531	35,100[3]
Finland	9,219	13,051	13,196	11,358	13,296
Sweden	143,300	84,135	132,276	176,368	156,500[3]
Asia: Japan	154,335	182,406	229,486	278,234	275,696
Africa: Northern Rhodesia	24,206	24,388	33,448	46,827	39,362
Oceania: Australia	3,002	3,000[3]	3,000[3]	3,000[3]	3,000[3]
World totals[1]	**1,922,000**	**1,462,000**	**1,649,000**	**1,667,000**	**2,056,000**

[1] This table incorporates a number of revisions of data published in previous chapters. Data do not add to exact totals shown because of rounding.
[2] Data not available, no estimate included in world total.
[3] Estimate.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TANTALUM-COLUMBIUM

There was renewed interest in the columbium deposits at Oka, Quebec. The St. Lawrence Columbium and Metals Corporation began construction of a concentrator which will treat pyrochlore at the rate of 500 tons per day. It has been indicated that there are 62 million tons of pyrochlore ore containing 500 million pounds of Cb_2O_5 located on this property. Columbium-tantalum occurrences have been reported in British Columbia, Northwest Territories and Ontario.

The E. & M. Journal price quotations in December, 1961 were: Columbite-per lb. of pentoxide, basis 65% Cb_2O_5 and Ta_2O_5 columbium-tantalum ratio 10 to 1, $1.18-$1.25; ratio 8½ to 1, $1.05 to $1.10 columbium metal $36 to $50 per pound. Tantalum metal per lb. powder, $30 to $58; sheet, $50 to $59; rod, $73 to $80.

TABLE 50. World Production of Columbium and Tantalum Mineral Concentrates, by Countries[1]

Country[1]	1958		1959		1960		1961	
	Columbium	Tantalum	Columbium	Tantalum	Columbium	Tantalum	Columbium	Tantalum
	pounds[2]							
North America:								
Canada	–		14,000[3]	–	–		61,050	–
United States	428,347		189,263		–		–	
South America:								
Argentina	2,262[3]	11,635[3]	3,591[3]	1,611[3]	–		–	4,444[4]
Brazil (Exports)	158,513	213,114	33,459	207,232	26,460	257,951	73,363[4]	159,925[4]
French Guiana	–		–		–		–	
Europe:								
Norway	630,516	–	639,114	–	589,951	–	707,677	–
Portugal (U.S. Imports)	65,461	32,513	38,083	27,227	35,383	34,062	22,457	29,793
Spain (U.S. Imports)	–		–		976	3,157	–	11,148
Sweden (U.S. Imports)	–	992	–		–		–	
Asia:								
Malaya, Federation of	356,160	–	268,800	–	208,320	–	206,080	–
Africa:								
Congo, Republic of The (Formerly Belgian) and Ruanda Urundi[4]	553,355		535,718		227,724[3]	332,424[3]	113,085[4]	164,277[4]
Malagasy Republic (Madagascar)	28,880		26,455		22,266		27,558[5]	
Mozambique	378,916		320,004		335,099		297,621	
Nigeria	1,803,200	49,930	3,559,875	31,114	4,587,520	24,640	5,257,260	26,230
Rhodesia and Nyasaland Federation of	–	96,260	–	116,820	–	108,080	–	138,380
South West Africa	4,152	6,574	2,610	1,539	10,390		670	5,790
Swaziland (Yttrotantalite)	–		–		–		–	
Uganda	6,384		5,264		5,040		16,240	
Union of South Africa	–	37,920	–	11,500	–	14,000	–	20,000
Oceania:								
Australia	13,507		18,950		23,679		31,806	
World totals (estimate)[2]	**4,880,000**		**6,050,000**		**6,850,000**		**7,370,000**	

Frequently the composition ($Cb_2O_5 - Ta_2O_5$) of these mineral concentrates lies in an intermediate position, neither Cb_2O_5 nor Ta_2O_5 being strongly predominant. In such cases the production figure has been centered.

[2] This table incorporates some revisions. Data do not add to totals shown due to rounding where estimated figures are included in the detail. The world total does not include U.S.S.R. for which country no production data are available.

[3] United States imports.

[4] In addition, tin-columbium-tantalum were produced as follows: 1958, 3,196,670 pounds; 1959, 2,773,387 pounds; 1960 estimated 1,500,000 pounds; columbium-tantalum content averaging about 10 percent.

[5] Exports.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TELLURIUM

Tellurium, like its associated element selenium, is commonly found in small amounts in copper-sulphide and gold ores. The potential production as a by-product in the refining of copper is great, but its recovery is restricted to meet the relatively minor quantities required by industry. The development of thermoelectric devices for refrigeration has brought an increased demand for tellurium and the price of the metal has risen from $1.75 per pound to $4.00 per pound.

Tellurium is recovered commercially in Canada at the Copper Cliff, Ontario, plant of the International Nickel Company of Canada, Limited, and at the Montreal East refinery of Canadian Copper Refiners, Limited. At Copper Cliff it is recovered from the slimes formed in the process of refining copper produced from the Sudbury nickel-copper ores. At Montreal East it is obtained from the refining of copper anodes made from copper ores at Noranda, and Gaspé, Quebec, and from blister copper originating from the copper-zinc ores of Hudson Bay Mining and Smelting Co., Limited, at Flin Flon, on the Manitoba-Saskatchewan boundary.

The price of tellurium was quoted at $5.75 a pound in New York in December, 1961.

TABLE 51. Production[1] of Tellurium, 1952-61

Year	Pounds	Value	Year	Pounds	Value
		$			$
1952	6,035	10,259	1957	31,524	55,167
1953	4,694	8,215	1958	38,250	65,025
1954	8,171	14,300	1959	13,023	27,999
1955	9,014	15,774	1960	44,682	156,388
1956	7,867	13,767	1961	77,609	376,404

[1] Includes some recoverable tellurium in blister copper, which was not necessarily recovered in the designated year.

TABLE 52. Refinery Output of Tellurium, 1952-61

Year	Pounds	Year	Pounds
1952	5,710	1957	34,895
1953	17,295	1958	42,337
1954	7,990	1959	8,900
1955	6,516	1960	41,756
1956	15,915	1961	81,050

TABLE 53. Consumption of Tellurium in Canada, 1960 and 1961

	1960	1961
	pounds	
By end-use:		
Metal alloys	1,578	1,875
Other (rubber, electronics)	2,660	2,968
Totals	**4,238**	**4,843**
By type:		
Metal pellets	2,578	1,259
Other (lump, powder, compounds)	1,660	3,584
Totals	**4,238**	**4,843**

TABLE 54. World Production of Tellurium by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	pounds				
North America:					
Canada	31,524	38,250	13,023	44,682	95,873
United States	252,000	123,000	177,000	271,000	205,000
South America: Peru	–	14,868	62,600	59,344	76,280
Asia: Japan	716	110	2,761	13,671	16,486
World totals	**284,200**	**176,200**	**255,400**	**388,700**	**393,600**

[1] This table incorporates a number of revisions of data published in previous tellurium chapters. Data do not add to exact world total shown because of rounding.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

THALLIUM

No production was reported in 1961 but in 1955 there were 275 pounds of thallium contained in the compounds shipped, which were valued at $378. This was the first shipment since 1944 when 128 pounds valued at $1,690 were contained in residues produced by Hudson Bay Mining and Smelting Company, Limited, at the Flin Flon smelter, Manitoba. These residues were exported for treatment in foreign plants. Thallium metal was quoted in the United States at $7.50 per pound nominal, December, 1961.

THORIUM

Thorium oxide and other thorium salts were produced at Elliot Lake, Ontario by Rio Tinto Dow Limited. The waste liquor from the uranium plant is treated to recover the thorium contents. Calcined thorium oxide was shipped to Dominion Magnesium Limited for further processing. Thorium salts were exported for treatment. Data on the quantity and value of production are not available for publication.

TIN

In British Columbia tin is found associated with base metal sulphide ores. The last mentioned type of occurrence is the only one that has been exploited and is the source of the small Canadian production. The lead-zinc-silver orebody of the Sullivan mine, Kimberley, British Columbia, contains a very small percentage of tin. Since 1941 the Consolidated Mining and Smelting Company of Canada, Limited, has been recovering a portion of this tin as a by-product from the concentration of its lead-zinc ore. In 1961 most of the tin concentrates were exported for treatment. Some tin was recovered as a lead-tin alloy during the processing of indium residues at the Canadian plant. Exploration work was done by Mount Pleasant Mines Limited on a tin-molybdenum, tungsten-copper-zinc prospect in Charlotte County, New Brunswick.

The New York quotations showed the monthly average price for tin was: January, $1.00 April, $1.07 July, $1.16 October, $1.21 December, $1.21 per pound.

TABLE 55. Production of Tin, 1952-61

Year	Pounds	Value	Year	Pounds	Value
		$			$
1952	212,113	253,581	1957	709,102[1]	580,342
1953	643,254[1]	581,746	1958	795,496[1]	625,260
1954	333,788[1]	263,359	1959	747,443[1]	630,094
1955	492,781[1]	408,030	1960	621,718[1]	522,243
1956	756,934[1]	670,441	1961	1,119,350	727,578

[1] Tin content of concentrates and lead-tin alloy.

TABLE 56. Production of New Tin, Domestic Consumption and Imports, 1952-61

Year	Production	Domestic consumption	Imports
	tons (2,000 pounds)		
1952	106	4,693	4,423
1953	322[1]	4,444	4,146
1954	167[1]	4,036	4,296
1955	246[1]	4,500	4,836
1956	378[1]	4,575	4,227
1957	355[1]	4,057	4,654
1958	398[1]	3,688	3,876
1959	374[1]	4,729	4,685
1960	311[1]	4,346	4,220
1961	560[1]	4,499	3,948

[1] Tin content of concentrates and lead-tin alloy.

TABLE 57. Imports of Tin, from Countries of Supply, 1960 and 1961

Country	1960		1961	
	Tons	Value	Tons	Value
		$		$
Tin blocks, pigs or bars				
United Kingdom	112	220,962	713	1,670,950
Malaya	2,196	4,326,843	1,793	4,009,328
Belgium-Luxembourg	1,333	2,587,092	694	1,625,349
Germany, West	125	243,534	143	325,100
Netherlands	22	42,108	—	—
United States	400	776,309	464	968,777
Bolivia	32	60,777	141	293,904
Totals	**4,220**	**8,257,625**	**3,948**	**8,893,408**
Tinfoil	pounds			
Germany, West	440	375	—	—
United Kingdom	—	—	175	145
United States	20,584	21,411	26,445	36,971
Kenya	208	229	—	—
Totals	**21,232**	**22,015**	**26,620**	**37,116**
Babbitt metal	pounds			
United Kingdom	35,800	3,953	24,400	4,263
United States	29,500	24,565	52,700	24,831
Totals	**65,300**	**28,518**	**77,100**	**29,094**

TABLE 58. Consumption of Tin (Ingots or Bars), 1960 and 1961

Used in production of	1960	1961
	tons (2,000 pounds)	
Babbitt	286	340
Bronze	177	265
Galvanizing	10	8
Solder	1,320	1,323
Tin plate and tinning	2,366	2,399
Other used (collapsible tubes, foil, etc.)	187	164
Totals accounted for	**4,346**	**4,499**

TABLE 59. World Mine Production of Tin (Content of Ore), by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	long tons[1]				
North America:					
Canada	317	355	334	278	389
Mexico	473	544	377	365	530
United States	—	—	50	10	[2]
Totals	**790**	**899**	**761**	**653**	[2]
South America:					
Argentina	182	205	225	244	350[3]
Bolivia (exports)	27,794	17,731	23,811	19,406	20,408
Brazil	293	409	380	1,556	[4]
Peru	12	30	25	25	17
Totals	**28,281**	**18,375**	**24,448**	**21,231**	[4]
Europe:					
Czechoslovakia[5]	200	200	200	200	200
France	445	—	—	21	141
Germany, East[3]	670	720	720	720	720
Portugal[6]	1,127	1,249	1,129	772	683
Spain	498	467	326	196	255
U.S.S.R.[7,8]	13,000	13,500	15,000	17,000	20,000
United Kingdom	1,028	1,087	1,252	1,199	1,210
Totals[3,8]	**17,000**	**17,200**	**18,600**	**20,100**	**23,200**
Asia:					
Burma[6]	1,200	1,300	1,300	1,100	1,100[3]
China[4]	23,000	23,000	26,000	28,000	30,000
Indonesia	27,723	23,201	21,616	22,599	18,574
Japan	949	1,108	998	842	852
Laos	274	301	294	383	332
Malaya, Federation of	59,293	38,458	37,525	51,979	56,028
Thailand	13,528	7,720	9,526	12,080	13,270
Totals[3,8]	**126,000**	**95,100**	**97,300**	**117,000**	**120,200**
Africa:					
Congo, Republic of the (formerly Belgian)	12,478	9,689	9,190	8,900[3]	6,570[3]
Ruanda-Urundi	1,803	1,490	1,124	1,200[3]	1,429[3]
Cameroon, Republic of	71	75	62	69	59
Congo, Republic of	—	26	32	34	31
Morocco: Southern Zone	8	6	9	10	12[3]
Niger, Republic of	50	61	57	53	47
Nigeria	9,534	6,200	5,541	7,675	7,779
Rhodesia and Nyasaland, Federation of	283	534	665	705	782
South West Africa	636	164	4	255	293
Swaziland	25	15	5	6	8
Tanganyika (exports)	14	19	65	138	163
Uganda	40	41	36	33	33
Union of South Africa	1,463	1,416	1,272	1,276	1,430
Totals	**26,405**	**19,736**	**18,062**	**20,354**	**18,636**
Oceania:					
Australia	1,952	2,237	2,351	2,202	2,593
World totals (estimate)	**200,400**	**153,500**	**161,500**	**181,500**	**188,000**

[1] This table incorporates some revisions of data published in previous tin chapters. Data do not add to totals shown due to rounding where estimated figures are included in the detail.

[2] Figure withheld to avoid disclosing individual company confidential data: included in world total.

[3] Estimated by authors of the chapter to appear in "Minerals Yearbook", and in a few instances, from the Statistical Bulletin of the International Tin Council, London, England.

[4] Data not available: estimate included in world total.

[5] Estimate, according to 43th annual issue of Metal Statistics (Metallgesellschaft) through 1960.

[6] Includes tin content of mixed concentrates.

[7] Estimated smelter production.

[8] Output from U.S.S.R. in Asia included with U.S.S.R. in Europe.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TITANIUM

At Lac Tio, Quebec, the Quebec Iron and Titanium Corporation mined ilmenite and shipped the ore by rail to Havre St. Pierre on the St. Lawrence and thence by boat to the smelter at Sorel, Quebec. There the ore was treated to produce iron (remelt) and slag.

The smelter slag, having a titanium dioxide content of about 72 per cent, was exported for further treatment. General statistics on the mining of ilmenite are included in the Miscellaneous Metals Industry but the statistics on smelting are included in The Smelting and Refining Industry.

For several years titanium-bearing ores have been shipped from the Baie St. Paul area in Quebec for treatment in the United States.

Some metallic titanium was produced from imported raw material by the Dominion Magnesium Limited, Haley, Ontario.

The paint industry uses, in addition to titanium white, a considerably larger amount of mixed pigments containing titanium, also imported from the United States. Titanium white has many other uses, such as: to make paper opaque, to make rubber white, in ceramic glazes, for printing inks, in linoleum, in cosmetics, and to de-lustre artificial silk.

Titanium is used in many other forms. Ferrotitanium and ferrocarbon-titanium are used under special circumstances to purify steel. It is all imported from the United States.

Prices (nominal) f.o.b. U.S. Atlantic ports at the end of 1961 were: Ilmenite, 59.5% TiO_2, $23 to $26 per gross ton. The nominal quotation for titanium metal, 99.3 per cent, was $1.60 per pound.

TABLE 60. Producers' Shipments of Titanium Ore to Outside Customers, 1952-61

Year	Short tons	Value	Year	Short tons	Value
		$			$
1952	51	459	1957	10,770	97,075
1953	9,292	80,085	1958	—	—
1954	1,541	9,462	1959	26,777	129,565
1955	1,464	10,634	1960	2,947	16,265
1956	2,310	16,561	1961	—	—

TABLE 61. Imports of Titanium Oxide and White Pigments Containing not Less than 14 Per Cent by Weight of Titanium, 1957-61

Year	From the United Kingdom		From the United States		Total imports	
	Pounds	Value	Pounds	Value	Pounds	Value
		$		$		$
1957	22,718,385	4,711,732	45,750,639	6,070,811	68,469,888	10,782,839
1958	21,775,393	4,649,207	37,100,353	3,814,991	58,878,496	8,464,690
1959	23,793,207	4,958,593	35,363,989	3,545,123	61,195,519	8,877,007
1960	19,350,694	4,052,615	33,348,008	3,386,029	53,792,895	7,648,278
1961	20,763,628	4,460,194	31,849,083	3,503,991	52,612,711	7,964,185

TABLE 62. Consumption of Titanium Oxide, by Industries, 1959 - 61

Industry	1959		1960		1961	
	Pounds	Cost at works	Pounds	Cost at works	Pounds	Cost at works
		$		$		$
Paints:						
Extended titanium dioxide pigments	28,977,611	3,214,999	27,972,318	3,121,796	26,207,395	2,953,377
Titanium dioxide	30,631,393	7,985,330	32,667,796	8,458,330	34,582,672	8,692,323
Miscellaneous chemicals	256,077	75,239	...	...	...	...
Pulp and paper	4,488,683	1,093,697	4,921,318	1,184,056	4,888,742	1,187,788
Linoleum and oilcloth	4,601,396	1,259,474	3,720,504	917,151	3,823,561	898,721
Rubber goods	1,741,635	437,118	1,532,501	387,226	1,869,110	465,436
Miscellaneous non-metallic minerals	1,012,516	271,529	1,235,340	333,482	1,143,366	305,912
Toilet preparations	19,747	8,969	28,605	8,896	48,937	15,199
Industrial chemicals	...	...	14,285	3,759	46,457	11,990
Synthetic textiles	...	...	91,850	27,125	64,650	19,875
Other chemical industries, n.e.s.	...	...	604,730	145,328	689,561	165,724
Totals accounted for	**71,729,058**	**14,346,355**	**72,789,247**	**14,587,149**	**73,364,451**	**14,716,345**

TABLE 63. World Production of Titanium Concentrates (Ilmenite and Rutile), by Countries[1,2]

Country[1]	1957	1958	1959	1960	1961
	short tons [1,2]				
Ilmenite					
Australia (shipments)	79,694	78,342	93,606	120,097	193,312
Canada[3]	269,690	161,312	270,477	389,586	463,362
Ceylon	—	—	—	6,720	11,199
Finland	116,568	117,384	94,966	92,219	21,272
Gambia	15,297	31,851	14,553	—	—
India	331,768	346,260	334,024	275,575	191,800
Japan (titanium slag)	8,998	3,932	3,445	1,444	1,778
Malagasy Republic (Madagascar)	—	1,151	659	3,008	3,640
Malaya (Exports)	102,742	83,806	81,593	132,255	119,812
Mexico	—	166	—	—	—
Mozambique	—	—	11,400	784	—
Norway	231,693	233,585	249,274	255,643	342,820
Portugal	388	506	2,113	1,002	1,100[4]
Senegal	39,573	36,927	32,941	24,159	17,200[4]
Spain	9,796	18,161	8,113	12,267	31,600[4]
Thailand	2,039	922	550	—	—
Union of South Africa	3,120	29,611	87,232	90,431	99,009
United Arab Republic (Egypt Region)	3,700[4]	3,000[4]	17,100	13,200	33,000[4]
United States[5]	757,180	563,338	634,886	786,372	782,412
World totals ilmenite (estimate)[1,2]	**1,972,200**	**1,710,300**	**1,936,900**	**2,204,800**	**2,313,300**
Rutile					
Australia	144,372	93,327	91,734	99,266	113,344
Brazil	270	269	231	238	220[4]
Cameroon, Republic of	44	—	—	—	—
India	530	503	429	1,082	898
Norway	22	—	—	—	—
Senegal	243	1,157	—	—	220[4]
Union of South Africa	32	552	3,381	3,695	3,483
United Arab Republic	—	—	1,157	1,100[4]	1,100[4]
United States	10,702	7,406	9,466	8,808	9,045
World totals rutile (estimate)[1,2]	**156,200**	**103,200**	**106,400**	**114,200**	**128,300**

[1] In addition to the countries listed titanium concentrates are produced in U.S.S.R., and Brazil produces ilmenite but no reliable information is available; no estimates are included in the total.

[2] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.

[3] Represents Ti.slag containing approximately 70 per cent TiO_2 and small quantities of "titanium ore".

[4] Estimate.

[5] Includes a mixed product containing ilmenite, leucoxene and rutile.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TABLE 64. Consumption of Ferrotitanium in the Manufacture of Steel, 1952-61

Year	Tons	Value	Year	Tons	Value
		$			$
1952	229	97,827	1957	252	82,258
1953	213	50,433	1958	210	76,689
1954	171	50,166	1959	252	84,683
1955	156	43,074	1960	418	207,489
1956	277	84,393	1961	236	109,615

TUNGSTEN

Tungsten concentrates were not produced in 1961. Mining of tungsten ores in British Columbia ceased in 1958. Tungsten bearing deposits occur in British Columbia, Yukon, North-west Territories, Ontario and New Brunswick.

As an alloying metal in steel, tungsten (usually as ferrotungsten, but sometimes as calcium tungstate or scheelite concentrate) is used essentially to impart hardness and toughness, which are maintained even when the steel is heated to a high temperature. Almost 80 per cent of the consumption of tungsten in the United States is used for the production of high-speed steels for cutting tools, in which the tungsten content is 15 to 20 per cent. Minor amounts of tungsten are used in steels for dies, valves and valve seats for internal combustion engines and for permanent magnets. Stellite, the best known non-ferrous alloy, contains 10 to 15 per cent tungsten with higher percentages of chromium and cobalt. Tungsten carbide is widely used as an extra hard cutting tool and is now being used as inserts into detachable bits for rock-drilling. Pure tungsten is used in lamp filaments, in radio tubes, contact points, etc.

The E. & M. Journal price quotations for tungsten ore in December 1961 were: Per short ton unit of WO_3, concentrates of known good analysis, basis 65%: Foreign ore per stu of WO_3 nearby arrival, c.i.f. U.S. ports duty extra; Wolfram $12.75 to $13.25, scheelite $12.75 to $13.25. U.S. mined tungsten concentrate, $22 per stu f.o.b. milling point, subject to penalties.

TABLE 65. Production (Commercial Shipments) of Tungsten Concentrate, 1950-61

Year	Concentrate	WO_3 content	Value
	pounds		$
1950	1,886,000[1]	284,078	160,343
1951	4,145	2,833	7,098
1952	3,670,686	1,493,111	4,488,237
1953	6,307,717	2,446,028	5,689,160
1954	3,237,748	2,170,633	5,795,781
1955	3,255,100	1,942,770	5,508,437
1956	3,401,712	2,271,437	6,351,376
1957	2,994,000	1,921,483	5,279,275
1958	1,022,000	690,976	1,898,455
1959-61	—	—	—

[1] Includes export of considerable low-grade material to United States.

TABLE 66. Imports of Tungsten Ores, from Countries of Supply, 1960 and 1961

Country	1960		1961	
	Pounds	Value	Pounds	Value
		$		$
Australia	—	—	—	—
Congo, Republic of the (formerly Belgian)	—	—	—	—
Bolivia	107,700	68,794	91,600	48,338
Korea	454,000	400,901	50,000	42,088
Peru	134,900	101,490	—	—
Spain	—	—	—	—
United States	200,000	214,967	250,000	247,775
Thailand	110,800	82,385	—	—
Argentina	94,400	57,777	55,100	29,095
Brazil	55,100	36,694	55,100	36,031
Totals	**1,156,900**	**963,008**	**501,800**	**403,327**

TABLE 67. World Production of Tungsten Ores, by Countries,[1] of Concentrates Containing 60 per WO,

Country	1957	1958	1959	1960	1961
	short tons[1]				
North America:					
Canada	1,602	575	—	—	—
Mexico	294	8	138	198	193
United States (shipments)	5,520	3,788	3,649	7,325	8,245
Totals	**7,416**	**4,371**	**3,787**	**7,523**	**8,438**
South America:					
Argentina	1,441	1,127	827	840[2]	830[2]
Bolivia (exports)	4,809	2,457	2,671	2,370	3,104
Brazil (exports)	2,304	2,596	1,609	2,205	1,607
Peru	1,215	992	542	538	474
Totals	**9,769**	**7,172**	**5,649**	**5,953**	**6,015**
Europe:					
Austria	140	146	152	243	317
Finland	—	163	42	—	63
France	1,091	1,152	959	783	834
Italy	20	10	6	8	8[2]
Portugal	4,756	2,109	2,478	3,189	3,213
Spain	1,319	1,301	854	1,028	1,100[2]
Sweden	557	660	375	386	440
U.S.S.R.[3]	8,800	9,400	9,900	10,500	11,000
United Kingdom	55	2	—	—	—
Yugoslavia	90	99	86	86	110[2]
Totals[2]	**16,800**	**15,050**	**14,900**	**16,200**	**17,100**
Asia:					
Burma[3]	1,910	1,100	820	1,215	1,150[2]
China[3]	16,500	16,500	19,800	22,000	22,000
Hong Kong	42	46	47	39	20
India	2	—	1	3	11
Japan	1,144	881	1,194	1,082	1,031
Korea: North[2]	2,665	3,300	4,400	5,500	5,500
Republic of	4,567	3,597	3,492	5,870	7,529
Malaya, Federation of	63	57	24	46	41
Thailand	1,080	725	553	486	565
Totals[2]	**28,000**	**26,200**	**30,350**	**36,250**	**37,850**
Africa:					
Congo, Republic of (formerly Belgian)[3]	1,055	1,200	1,038	634	640
Ruanda-Urundi	797	279	171	504	734
Rhodesia and Nyasaland, Federation of:					
Southern Rhodesia	180	103	36	11	55
South West Africa[3]	278	64	2	154	192
Tanganyika (exports)	1	—	—	—	3
Uganda (exports)	224	31	14	84	116
Union of South Africa	290	61	42	37	30
United Arab Republic (Egypt)	—	—	—	—	95[2]
Totals	**2,825**	**1,738**	**1,303**	**1,424**	**1,865**
Oceania:					
Australia	2,629	1,587	1,218	2,069	2,877
New Zealand	36	3	11	9	9[2]
Totals	**2,665**	**1,590**	**1,229**	**2,078**	**2,886**
World totals (estimate)	**67,500**	**56,100**	**57,200**	**69,400**	**74,200**

[1] This table incorporates some revisions. Data do not add exactly to totals shown because of rounding where estimated figures are included in the detail.
[2] Estimate.
[3] Including WO, in tin-tungsten concentrates.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

URANIUM

In 1961 the output of uranium precipitates from the mines in Ontario were valued at $151,060,610. The Beaverlodge area in Saskatchewan shipped $44,631,014 worth of U_3O_8. The mines in the Northwest Territories ceased production in 1960.

Detailed technical data on the uranium industry appears in "Uranium in Canada 1960" Review 26 issued by the Department of Mines and Technical Surveys, Ottawa.

In the table below the values shown from 1935 to 1940 are for products from the refinery which include radium salts, uranium salts and compounds of silver, cobalt and nickel. The data for 1941-53 are restricted. The figures for 1954 and 1955 are the value of the products of the refinery at Port Hope, Ontario. The value of the U_3O_8 contained in the precipitates or concentrates shipped from the mines is shown in 1956-61.

TABLE 68. Producers' Shipments[1] of Uranium, Radium, etc., 1935-61

Year	U_3O_8	Value	Year	U_3O_8	Value
	pounds	$		pounds	$
1935	...	413,700	1954	...	26,373,052
1936	...	605,500	1955	...	26,031,604
1937	...	876,540	1956	4,581,060	45,732,145
1938	...	1,045,458	1957	13,271,414	136,304,364
1939	...	1,121,553	1958	26,805,232	279,538,471
1940	...	410,176	1959	31,784,189	331,143,043
1941-53	...	..	1960	25,495,369	269,938,192
			1961	19,281,465	195,691,624

[1] Compilation method is shown in text above.

TABLE 69. World Production of Uranium Oxide U_3O_8, by Countries[1,2,3]

Country[1]	1957	1958	1959	1960	1961
	short tons[2]				
North America:					
Canada	6,636	13,403	15,392	12,748	9,822
United States[4]	8,640	12,570	16,420	17,760	17,399
South America:					
Argentina[5]	20	20	13	10	10
Europe:					
Finland[5]	—	—	—	40	30
France	465	660	955	1,388[6]	1,637[7]
Germany West[5]	—	—	3	12	12
Sweden	10	10	10[5]	10[5]	10[5]
Spain[5]	—	—	—	60	60
Africa:					
Congo, Republic of the (formerly Belgian)	1,300	2,300	2,300	1,200	—
Malagasy Republic (Madagascar[5])	70	95	115	[6]	[7]
Rhodesia and Nyasaland (Federation of)	25	50	38	—	—
Union of South Africa	5,700	6,245	6,445	6,409	5,468
Oceania:					
Australia[5]	400	700	1,100	1,100	1,400
World totals (estimate)[1,2]	**23,270**	**36,050**	**43,320**	**40,740**	**35,850**

[1] In addition to the countries listed, uranium is also known to have been produced in Colombia, India, Italy, Japan, Morocco, Mozambique, and Portugal, but production data are not available. An estimate for these countries has been included in the world total.

[2] Uranium is also believed to be produced in Czechoslovakia, East Germany, Hungary and U.S.S.R. but production data are not available; for these countries no estimate has been included in the world total. Estimates of production for these countries range from 10,000 to 20,000 tons per year.

[3] This table incorporates a number of revisions of data published in previous uranium chapters. Data do not add to exact total shown because of rounding where estimated figures are included in the detail.

[4] Data represents deliveries to A.E.C. Includes uranium production from phosphate rock in eastern United States.

[5] Estimate.

[6] Madagascar included with France.

[7] Madagascar and Gabon included with France.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

TABLE 70. Exports of Uranium Ores and Concentrates, 1959-61

Destination	1959	1960	1961
	dollars		
United Kingdom	32,602,978	25,904,553	18,255,934
Germany, West	129,262	293,971	512,658
Japan	106,831	147,011	39,733
United States	278,912,726	236,594,407	173,914,072
India	20,000	570,480	—
Austria	1,591	—	—
Denmark	284	—	—
Sweden	8,711	27,720	—
Switzerland	121,760	1,000	—
France	—	250	—
Italy	—	230	—
Netherlands	—	1,310	—
Totals	**311,904,143**	**263,540,932**	**192,722,397**

VANADIUM

Some of the magnetites of the Rainy River district in Ontario are known to contain relatively small quantities of vanadium, and some research has been conducted as to its economic recovery. There is no production of either the metal or its ores in Canada at the present time.

The principal world occurrences of vanadium are in Arizona, Colorado and Utah in the United States; Minasragra in Peru; Broken Hill in Northern Rhodesia; and Grootfontein district in South West Africa.

The metal is employed chiefly in the manufacture of alloy steels and irons. It is also used in the form of ammonia meta-vanadate as a catalyst in the manufacture of sulphuric acid, and in the non-ferrous, glass, ceramic and colour industries.

The United States Bureau of Mines reports that vanadium has been and is now being obtained by some countries from other than vanadium ores, including petroleum, bauxite, phosphate rock and titaniferous magnetites.

Vanadium ore was quoted December, 1961, at 31 cents per pound, (V_2O_5 content) f.o.b. shipping point, by "E & M J Metal and Mineral Markets", New York. Vanadium metal was quoted at $3.45 per pound.

TABLE 71. World Production of Vanadium in Ores and Concentrates

Country	1957	1958	1959	1960	1961
	short tons[1]				
North America:					
United States (recoverable vanadium)	3,691	3,030	3,719	4,971	5,269
South America:					
Argentina	2	4	4	[2]	[2]
Europe:					
Finland	290	430	556	625	630[3]
Africa:					
Federation of: Northern Rhodesia (recoverable vanadium)	—	—	—	—	110[3]
Angola	1	20	3	—	—
South West Africa (recoverable vanadium)	283	435	719	838	1,145
Union of South Africa: Transvaal	8	316	320	656	1,422
World totals (estimate)[1,4]	**4,275**	**4,235**	**5,321**	**7,090**	**8,576**

[1] This table incorporates some revisions.
[2] Data not available.
[3] Estimate.
[4] Total represents data only for countries shown in table and excludes vanadium in ores produced in Republic of the Congo (formerly Belgian), Mexico, Morocco (Southern Zone), Norway, Spain and U.S.S.R. for which figures are not available, the total also excludes quantities of vanadium recovered as by-products from other ores and raw materials.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

ZIRCONIUM

Zirconium ores are not mined in Canada. The Dominion Magnesium Limited, Haley, Ontario, produced zirconium from imported raw materials.

Zirconium is important in certain steel making, ordinarily being added in the form of zirconium-ferrosilicon alloy; its function is that of a powerful deoxidizer, degasifier and grain refiner; zirconium-treated steel being particularly suitable for tools subject to violent stresses, such as stock drills.

Prices quoted in December, 1961 were: zircon ore, 65 per cent ZrO_2, $48 to $50 per long ton, at Atlantic seaboard; zirconium sponge, $5 to $10 per pound for commercial grade.

TABLE 72. World Production of Zirconium Ores and Concentrates, by Countries[1]

Country[1]	1957	1958	1959	1960	1961
	short tons[1]				
Australia	99,188	66,381	125,834	114,384	156,900
Brazil[3]	1,799	10,471	10,846	6,358	[4]
Egypt	45	45[2]	60[2]	370	[4]
India	10	10	10	10	10
Malagasy Republic (Madagascar)	1	58	50	375	220[2]
Malaya, Federation of	47[5]	28[5]	130	63	80[5]
Nigeria (U.S. imports)	101	—	1,080	1,619	686
Senegal, Republic of	3,197	7,606	9,557	11,408	6,100[2]
Union of South Africa	—	1,129	5,924	7,366	7,607
United States	56,802[6]	30,443[7]	[8]	[8]	[8]

[1] This table incorporates some revisions.
[2] Estimate.
[3] Chiefly baddeleyite.
[4] Data not available.
[5] Exports.
[6] Includes Florida only.
[7] Excludes Idaho.
[8] Figure withheld to avoid disclosing individual company confidential data.

Source: "Minerals Yearbook" published by the United States Bureau of Mines.

List of Operators of Miscellaneous Metal Mines, 1961

Name of firm and product	Head office address	Location of mine or plant
Aluminum:		
Aluminum Company of Canada Limited	1700 Sun Life Building, Montreal, Quebec	Arvida, Quebec; Shawinigan Falls, Quebec; Ile Maligne, Quebec; Beauharnois, Quebec; Kitimat, British Columbia
Canadian British Aluminum Co. Ltd.	Baie Comeau, Quebec	Baie Comeau, Quebec
Antimony:		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Barium:		
Dominion Magnesium Ltd.	Haley, Ontario	Haley, Ontario
Beryl:		
Canadian Beryllium Mines & Alloys Ltd.[1]	100 Adelaide St. W., Toronto, Ontario	Renfrew County, Ontario
Dalhart Beryllium Mines & Metals Corp.[1]	217 Bay St., Toronto, Ontario	Dalhart, Manitoba
Gill Mining Corp.[1]	4352 Beaubien Est., Montreal, Quebec	Temiscamingue, Quebec
Bismuth:		
Deloro Smelting & Refining Co. Ltd.	900 Victoria Building, Ottawa, Ontario	Deloro, Ontario
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Molybdenite Corp. of Canada Ltd.	59 St. James St. W., Montreal, Quebec	La Corne Twp., Quebec
Gaspé Copper Mines Ltd.	44 King St. W., Toronto, Ontario	Murdockville, Quebec
Cadmium:		
East Sullivan Mines Ltd.	1403 Aldred Bldg., Montreal, Quebec	Bourlamaque, Quebec
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Hudson Bay Mining & Smelting Co. Ltd.	500 Royal Bank Building, Winnipeg, Manitoba	Flin Flon, Manitoba
Canadian Exploration Ltd.	Royal Bank Bldg., Vancouver, British Columbia	Salmo, British Columbia
Carnegie Mines of British Columbia Ltd.	1126 Sherbrooke St. W., Montreal, Quebec	Slocan, British Columbia
Highland Bell Ltd.	789 W. Pender St., Vancouver, B.C.	Greenwood, British Columbia
Howe Sound Company, Britannia Division	500 Fifth Ave., New York 36, U.S.A.	Britannia Beach, British Columbia
Mastodon Highland Bell Mines Ltd.	1200 West Pender St., Vancouver	Revelstoke, British Columbia
New Cronin Babine Mines Ltd.	844 West Hastings St., Vancouver	Smithers, British Columbia
Reeves Macdonald Mines Ltd.	413 Granville St., Vancouver, B.C.	Remac, British Columbia
Sheep Creek Gold Mines Ltd.	413 Granville St., Vancouver, British Columbia	Zincton, British Columbia
Violamac Mines (B.C.) Ltd.	New Denver, British Columbia	New Denver, British Columbia
United Keno Hill Mines Ltd.	85 Richmond St. W., Toronto, Ontario	Elsa, Yukon
Cerium:		
Atlin-Ruffner Mines (B.C.) Ltd.[1]	510 W. Hastings St., Vancouver, British Columbia	Parry Sound, Ontario
Chromite:		
Colonial Chrome Co. Ltd.[1]	420 Lexington Ave., New York, N.Y., U.S.A.	Black Lake, Quebec
Gunnar Gold Mines Ltd.[1]	80 King St., Toronto, Ontario	Bird River, Manitoba
Strannar Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Lac du Bonnet, Manitoba
Germanium:		
Taiga Mines Ltd.[2]	837 W. Hastings St., Vancouver, B.C.	Powell River, B.C.
Indium:		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Manganese:		
Quebec Manganese Mines Ltd.[1]	231 St. James St. W., Montreal, Quebec	Magdalen Islands, Quebec
Stratmat Ltd.[1]	620 Cathcart St., Montreal, Quebec	Woodstock, New Brunswick
St. Maurice Minerals Corp.[1]	1434 Ste-Catherine St., Montreal, Quebec	St. Denis Twp., Quebec
Joburke Gold Mines Ltd.[1]	357 Bay St., Toronto, Ontario	Nastapoka Islands, N.W.T.
Magnesium:		
Dominion Magnesium Ltd.	67 Yonge St., Toronto, Ontario	Haley, Ontario
Mercury:		
Bralorne Mines Ltd.[1]	555 Burrard St., Vancouver, British Columbia	Omineca district, British Columbia
Consolidated Mining & Smelting Company of Canada Ltd.[1]	215 St. James St., Montreal, Quebec	Pinchi Lake, British Columbia

See footnotes at end of List.

List of Operators of Miscellaneous Metal Mines, 1961 — Continued

Name of firm and product	Head office address	Location of mine or plant
Molybdenite:		
Anglo-American Molybdenite Mining Corp.[2]	Box 577 Val D'Or, Quebec	Preissac Twp., Quebec
Frandi Mining Corp.[2]	82 Thibeau, Cap-de-la-Madeleine, Québec	Mekinac, Quebec
Frontenac Mining Corp.[2]	5083 St. Denis, Montreal, Quebec	Frontenac County, Quebec
Huron Mining & Exploration Corp.[2]	380 Deslauriers Ave. St-Laurent, Québec	Huddersfield Twp. Quebec
Molybdenite Corp. of Can. Ltd.	485 rue McGill, Montreal, Quebec	La Corne, Quebec
McDougall-Lusk Mineral Exploration[1]	4204 St. Catherine St. W., Montreal, Quebec	Eardley Twp., Quebec
Portneuf Mineral Corp.[2]	437 St. James St. W., Montreal, Quebec	Portneuf, Quebec
Preissac Molybdenite Mines Ltd.[2]	485 McGill St., Montreal, Quebec	Preissac, Quebec
Provincial Molybdenum Corp. Ltd.[2]	132 Main St., Maniwaki, Quebec	Kinsington Twp., Quebec
Nortoba Mines Ltd.[2]	199 Bay St., Toronto, Ontario	Sturgeon River, Ontario
Huestis Molybdenum Corp. Ltd.[2]	402 W. Pender St., Vancouver, B.C.	Cariboo area, British Columbia
Canol Metal Mines Ltd.[2]	25 Adelaide St. W., Toronto, Ontario	Quiet Lake, Yukon
Stormy Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Quiet Lake, Yukon
Noranda Exploration Co. Ltd.[2]	2256 West 12th Ave., Vancouver, B.C.	Boss Mountain, B.C.
Selenium-Tellurium:		
International Nickel Co. of Canada Ltd.	Copper Cliff, Ontario	Copper Cliff, Ontario
Canadian Copper Refiners Ltd.	1600 Royal Bank Building, Toronto, Ontario	Montreal East, Quebec
Tantalum-Columbite:		
Barymin Explorations Ltd.[1]	25 Adelaide St. W., Toronto	Oka, Quebec
Bouscadillac Gold Mines Ltd.[1]	85 Richmond St. W., Toronto, Ontario	L'Annonciation, Quebec
Coulee Lead & Zinc Mines Ltd.[2]	55 Yonge St. Toronto, Ontario	Oka, Quebec
Headway Red Lake Gold Mines Ltd.[2]	67 Yonge St., Toronto, Ontario	Oka, Quebec
Main Oka Mining Corp.[1]	159, Ouest, rue Craig, Montreal, Quebec	Oka, Quebec
Oka Rare Metals Mining Co. Ltd.[1]	320 Bay St., Toronto, Ontario	Oka, Quebec
Columbium Mining Products Ltd.[2]	55 Yonge St., Toronto, Ontario	Oka, Quebec
Gulf Lead Mines Ltd.[2]	25 Adelaide St. W., Toronto, Ontario	Oka, Quebec
General Managers Inc.[2]	159 Ouest, rue Craig, Montreal, Quebec	Oka, Quebec
Ontario Nickel Mines Ltd.[1]	100 Adelaide St. West, Toronto, Ontario	Oka, Quebec
Quebec Columbium Ltd.	507 Place D'Armes, Montreal, Quebec	L'Annonciation, Quebec
St. Lawrence Columbium & Metals Corp.	159 Ouest, rue Craig, Montreal, Quebec	Oka, Quebec
Trebor Mines Ltd.[1]	100 Adelaide St. W., Toronto, Ontario	Ile Aux Tourtes, Québec
Twin Mountain Uranium Mines Ltd.[1]	302 Bay St., Toronto, Ontario	Oka, Quebec
Ontario Rare Metal Mines Ltd.[1]	44 King St. W., Toronto, Ontario	Algoma, Ontario
Quebec Metallurgical Industries Ltd.[1]	88 Metcalfe St., Ottawa, Ontario	Bugaboo Creek, B.C.
Thallium:		
Hudson Bay Mining & Smelting Co. Ltd.[2]	500 Royal Bank Building, Winnipeg, Manitoba	Flin Flon, Manitoba
Thorium:		
Rio Tinto-Dow Ltd.	Box 190, Elliot Lake, Ontario	Elliot Lake, Ontario
Tin:		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Mountain Crest Mines Ltd.[1]	1445 MacKay St., Montreal, Quebec	Charlevoix, Quebec
Mount Pleasant Mines Ltd.[2]	35 Lambton Road, Ottawa, Ontario	St. Andrews, New Brunswick
Titanium ore:		
Bersimis Mining Co.	16 Blvd. des Capucins, Quebec	Saguenay Co., Quebec
Continental Titanium Corp.	5165 Sherbrooke St. W., Montreal, Quebec	St. Urbain Co., Quebec
Kelley Mining Corp.[2]	1026 rue St. Jean, Quebec, Quebec	St. Urbain Co., Quebec
Laurentian Titanium Mines Ltd.	4462 St. Denis St., Montreal, Quebec	Wexford Twp., Quebec
Les Mineraux Laurentiens Ltd.[2]	St. Joseph de Beauce, Quebec	St. Urbain Co., Quebec
Quebec Iron and Titanium Corp.	Box 40, Sorel, Quebec	Parker Twp., Sorel, Quebec
Saguenay Exploration & Mining Inc.	753 avenue Wilder, Outremont 8, Quebec	Jonquière, Quebec
Tungsten concentrates:		
Burnt Hill Tungsten Mines Ltd.[1]	510 McGill St., Montreal, Quebec	Cross Creek, New Brunswick
Canada Tungsten Mining Corp. Ltd.[2]	12 Richmond St. East, Toronto, Ontario	Flat River, N.W.T.
Canadian Exploration Ltd.[2]	Royal Bank Building, Vancouver, British Columbia	Salmo, British Columbia
Consolidated Mining & Smelting Co. of Canada Ltd.[1]	Trail British Columbia	Kimberley, British Columbia
Piermond Mining Co. Ltd.[1]	12323 rue Notre Dame des Anges, Montreal	Risborough, Quebec
Uranium:		
New Brunswick:		
Aumacho River Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Aumacho River, New Brunswick
New Brunswick Uranium Metals & Mining Ltd.[1]	305 Bay St., Toronto, Ontario	Harvey, New Brunswick
Quebec:		
Bell Channel Mines Ltd.[2]	25 Adelaide St. W., Toronto, Ontario	Isle Dieu Twp.
Calumet Uranium Mines Ltd.[1]	159 Ouest, rue Craig, Montreal	Isle Calumet
Marlowe Mines Ltd.[1]	2157 Mackay St., Montreal	Pied des Monts
Mogul Mining Corp. Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Figuery Twp.
Molybdenum Corp. Of America[1]	500 Fifth Ave., New York, U.S.A.	Oka, Quebec
Nakada Radioactive Minerals Inc.[1]	202 Fobes Bldg., Syracuse N.Y., U.S.A.	Egan Twp.
Quebec North Mines Ltd.[1]	2144 Mackay St., Montreal	Arrache Co.

See footnotes at end of List.

List of Operators of Miscellaneous Metal Mines, 1961 — Concluded

Name of firm and product	Head office address	Location of mine or plant
Uranium — Concluded:		
Ontario:		
Bracemac Mines Ltd.[1]	347 Bay St., Toronto	Blind River
Buckles Algoma Uranium Mines Ltd.[2]	44 King St. W., Toronto	Blind River
Canadian Dyno Mines Ltd.	25 Adelaide St. W., Toronto	Cardiff Twp.
Denison Mines Ltd.	4 King St. W., Toronto	Quirke Lake
Delta Minerals Ltd.[2]	145 Yonge St., Toronto	Blind River
Duvex Oil & Mines Ltd.[2]	100 Adelaide St. W., Toronto	Blind River
Faraday Uranium Mines Ltd.	100 Adelaide St. W., Toronto	Bancroft
Lexindin Gold Mines Ltd.[1]	25 Adelaide St. W., Toronto	Blind River
Macassa Gold Mines Ltd.	85 Richmond St. W., Toronto	Bancroft
Macfie Explorations Ltd.[2]	145 Yonge St., Toronto	Red Lake
Milliken Lake Uranium Mines Ltd.[3]	335 Bay St., Toronto	Blind River
Nipirion Mines Ltd.[2]	302 Bay St., Toronto	Biddulph Twp.
Northspan Uranium Mines Ltd.[3]	335 Bay St., Toronto	Elliot Lake
Pardee Amalgamated Mines Ltd.[1]	111 Richmond St., Toronto	Blind River
Pronto Uranium Mines Ltd.[3]	335 Bay St., Toronto	Long Twp.
Preston Mines Ltd.	335 Bay St., Toronto	Elliot Lake
Rio Algom Mines Ltd.	335 Bay St., Toronto	Elliot Lake, Quirke Lake
Stancan Uranium Corp.[1]	80 Richmond St. W., Toronto	Blind River
Stanrock Uranium Mines Ltd.	80 Richmond St. W., Toronto	Elliot Lake
Zenmac Metal Mines[1]	200 Bay St., Toronto	Blind River
Saskatchewan:		
Baska Uranium Mines Ltd.[1]	2,108 Montagne St., Regina, Sask.	Beaverlodge
Cayzor Athabaska Mines Ltd.[1]	67 Yonge St., Toronto, Ontario	Uranium City
Dee Explorations Ltd.[1]	104 Main St., Flin Flon, Manitoba	Athabaska
Gaitwin Explorations Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Milliken Lake
Gulch Mines Ltd.[1]	217 Bay St., Toronto, Ontario	Uranium City
Gunnar Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Athabaska
Iso Mines Ltd.[1]	100 Adelaide St. W., Toronto, Ontario	Athabaska
Lavant Mines Ltd.[1]	627 Bay St., Toronto, Ontario	Beaverlodge
Joburke Gold Mines[2]	357 Bay St., Toronto, Ontario	Beaverlodge
Lorado Uranium Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Uranium City
National Explorations Ltd.[1]	789 W. Pender St., Vancouver, B.C.	Athabaska
Rosbitt Labine Uranium Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Uranium City
Rio Mines Ltd.[1]	532 Burrard St., Vancouver, British Columbia	Black Lake
Pitch Ore Uranium Mines Ltd.[1]	200 Bay St., Toronto, Ontario	Beaverlodge
Pitchvein Mines Ltd.[1]	82 Government Rd., Kirkland Lake, Ontario	Athabaska
Pluton Uranium Mines Ltd.[1]	11 King St. W., Toronto, Ontario	Beaverlodge
Rix Athabaska Uranium Mines Ltd.[1]	335 Bay St., Toronto, Ontario	Uranium City
Radiore Uranium Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Uranium City
British Columbia:		
Quebec Metallurgical Industries Ltd.[2]	88 Metcalfe St., Ottawa, Ontario	Golden
Rexspar Uranium & Metals Mining Co. Ltd.[2]	170 Bay St., Toronto, Ontario	Birch Island
Northwest Territories:		
Consolidated Northland Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Marian River
Eldorado Mining & Refining Ltd.[2]	Box 379, Ottawa, Ontario	Port Radium, N.W.T.; Eldorado, Saskatchewan; Port Hope, Ontario
Rayrock Mines Ltd.[1]	25 Adelaide St. W., Toronto, Ontario	Sherman Lake
Zirconium:		
Dominion Magnesium Ltd.	67 Yonge St., Toronto, Ontario	Haley, Ontario

[1] Holds dormant property.
[2] Active but not producing.
[3] Amalgamated with Rio Algom Mines Ltd.