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CANADA

THE MISCELLANEOUS METAL MINING INDUSTRY

1954

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THE MISCELLANEOUS METAL MINING INDUSTRY
1954

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NOTICE

The annual reports prepared by the Industry and Merchandising Division of the Bureau of Statistics are divided into 3 volumes, as follows: **Volume I** – The Primary Industries, including mining, forestry and fisheries; **Volume II** – Manufacturing; **Volume III** – Merchandising and Services. The volumes are made up of parts, and the parts in turn are subdivided according to the industries which they comprise.

Volume I consists of the following parts:

Part I – Mineral Statistics
Part II – Forestry Statistics – Operations in the Woods
Part III – Fisheries Statistics

Part I includes the following reports which constitute the complete series on Mineral Statistics of Canada. Individual reports are issued as the information becomes available; they are arranged in a form suitable for binding.

A – General Review of the Mining Industry, 50¢
B – The Gold Mining Industry, 50¢
C – The Silver-Lead-Zinc Mining Industry, 25¢
D – The Nickel-Copper Mining, Smelting and Refining Industry, 25¢
E – The Miscellaneous Metal Mining Industry, 25¢
F – The Smelting and Refining Industry, 25¢
G – The Coal Mining Industry, $1.00
H – The Crude Petroleum and Natural Gas Industry, 25¢
I – The Asbestos Mining Industry, 25¢
J – The Feldspar and Quartz Mining Industry, 25¢
K – The Gypsum Industry, 25¢
L – The Peat Industry, 25¢
M – The Salt Industry, 25¢
N – The Talc and Soapstone Industry, 25¢
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P – The Cement Manufacturing Industry, 25¢
Q – The Clay and Clay Products Industry, 25¢
R – The Lime Industry, 25¢
S – The Sand and Gravel Industry, 25¢
T – The Stone Industry, 25¢
U – Contract Drilling in the Mining Industry, 25¢

THE MISCELLANEOUS METAL MINING INDUSTRY

1954

Including

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

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 1954 and classified as miscellaneous include antimony, bismuth, cadmium, calcium, chromite, iron ore, magnesium, molybdenite, pitchblende, selenium, tellurium, titanium ore, tin, tantalum and tungster concentrates. In addition to particulars relating to these metals or minerals, the bulletin contains notes of a summary nature on aluminum, beryllium, mercury, 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.

Of the 180 active firms in the miscellaneous metals industry there were 19 which made shipments of ore or metal-bearing concentrates. There was an average of 6,494 persons employed to whom $24,603,658 were paid as salaries and wages. Fuel cost $1,998,029 and 206,815,120 kwh. of electricity were purchased for $1,555,329. Process supplies, containers, and freight and ore treatment charges amounted to $13,688,464. Gross value of production was $83,379,952.

TABLE 1. Principal Statistics of the Miscellaneous Metal Mining Industry, Significant Years 1921-1954

Year	Establishments	Employees	Earnings	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of products	Net value[1] of production
	No.	No.	$	$	$	$	$
1921	4	44	68,606	45,376	N.A.	230,164	N.A.
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
1950	16	3,225	8,578,969	1,387,828	3,272,336	23,646,960	15,108,311
1951	31	3,891	12,251,755	1,864,309	3,299,651	31,474,736	21,765,843
1952	47	5,163	18,370,772	2,582,194	5,758,407	39,643,078	25,523,464
1953	54	5,784	23,023,639	3,132,808	6,907,890	51,076,472	35,136,282
1954[2]	180	6,494	24,603,658	3,553,358	10,174,222	83,379,952	66,138,130

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.

TABLE 2. Employees and Their Earnings in the Miscellaneous Metal Mining Industry, 1950-1954

Year	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Office and administrative		Workmen		Total		Office and administrative	Workmen	Total
	Male	Female	Male	Female					
							$	$	$
1950	248	26	2,907	44	2,951	7,099,298	986,545	7,592,424	8,578,969
1951	299	31	3,521	40	3,891	7,993,679	1,232,628	11,019,127	12,251,755
1952	530	48	4,539	46	5,163	13,951,913	2,244,224	16,126,548	18,370,772
1953	593	74	5,076	41	5,784	13,230,772	3,042,167	19,981,472	23,023,639
1954	685	97	5,663	49	6,494	13,333,113	3,086,429	21,517,229	24,603,658

TABLE 3. Average Number of Workmen, by Months, 1953 and 1954

Month	1953						1954					
	Surface		Underground	Mill		Total	Surface		Underground	Mill		Total
	Male	Female		Male	Female		Male	Female		Male	Female	
January	2,359	34	1,943	240	3	4,579	2,466	42	2,380	347	4	5,239
February	2,309	34	1,964	237	3	4,547	2,396	43	2,390	351	4	5,184
March	2,371	34	1,979	247	3	4,634	2,406	47	2,426	357	5	5,241
April	2,450	36	1,977	213	4	4,680	2,482	49	2,356	352	5	5,244
May	2,641	31	2,031	244	4	4,951	2,818	45	2,293	364	4	5,524
June	2,916	35	2,123	250	4	5,328	3,227	37	2,282	394	4	5,944
July	3,049	37	2,147	243	4	5,480	3,339	44	2,190	415	5	5,993
August	3,172	42	2,170	232	4	5,620	3,525	43	2,199	415	5	6,187
September	3,117	40	2,138	249	3	5,547	3,548	46	2,195	422	5	6,216
October	2,967	40	2,169	240	3	5,419	3,364	44	2,207	425	5	6,045
November	2,865	42	2,218	217	3	5,345	3,145	42	2,220	407	5	5,819
December	2,791	42	2,199	240	3	5,275	2,706	38	1,706	370	6	4,826
Average	**2,751**	**38**	**2,089**	**236**	**3**	**5,117**	**3,043**	**45**	**2,238**	**382**	**4**	**5,712**
Man-hours worked						11,613,930						11,559,177

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.

The production of aluminum ingots in 1954 amounted to 557,897 tons compared with 548,445 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 La Tuque plant, which had not operated for several years, was sold. All of these plants are located in Quebec.

In British Columbia the new reduction plant at Kitimat came into production during August, 1954. The electric power for this plant is generated at Kemano. Alumina for the smelter is brought by ship 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, fluorspar from Newfoundland and cryolite from Greenland and the United States.

The price of aluminum ingot was 19 cents per pound at the close of 1954. Effective January 1, 1948, the United States import tariff on aluminum metal and alloys was reduced from 3 cents to 2 cents per pound. The price in the United States was quoted at 22.2 cents in December, 1954.

TABLE 4. Production, Consumption, Imports and Exports of Aluminum Ingots, 1945-1954

Year	Production	Consumption	Exports	Imports
	Tons of 2,000 pounds			
1945	215,712	40,800	382,286	51
1946	194,117	33,825	187,336	246
1947	299,066	50,265	230,175	616
1948	367,079	65,433	328,551	25
1949	369,466	58,767	288,364	40
1950	396,882	65,185	335,726	63
1951	447,095	86,241	354,414	270
1952	499,758	90,287	412,589	13
1953	548,445	88,548	459,692	35
1954	557,897	80,355	468,494	115

TABLE 5. Imports of Aluminum and Bauxite, 1953 and 1954

Item	1953		1954	
	Tons	$	Tons	$
Alumina	301	115,074	6,679	336,724
Bauxite ore	2,688,465	16,583,744	2,955,419	20,064,266
Cryolite	84	20,832	4,454	814,840
Aluminum:				
Pigs, ingots and blocks	35	83,623	115	52,577
Scrap	125	24,009	95	21,275
Angles, channels and beams	714	774,417	428	503,775
Bars, rods and wire	754	629,589	609	482,737
Leaf or foil	...	377,863	...	310,010
Pipes and tubes	596	846,642	655	613,837
Plates, sheets and strips	5,153	4,050,337	2,775	2,187,265
Powder	139	97,294	294	168,292
Wire and cable	70	76,617	1,541	824,680
Household hollow-ware	...	1,457,920	...	1,374,452
Manufactures, n.o.p.	...	8,023,509	...	9,759,148

TABLE 6. Exports of Aluminum, 1953 and 1954

Item	1953		1954	
	Tons	$	Tons	$
Aluminum scrap	13,454	3,805,992	13,923	3,888,927
Aluminum in primary forms	459,692	160,565,684	468,494	169,462,223
Aluminum manufactures, n.o.p.	...	1,921,834	...	1,532,162
Aluminum, semi-fabricated	17,377	9,006,736	17,447	9,041,168
Aluminum kitchen utensils	...	65,967	...	52,850
Aluminum foil	489	489,620	549	537,159

TABLE 7. World Production of Aluminum, 1950-1954 (From the Annual Report of the American Bureau of Metal Statistics)

Country	1950	1951	1952	1953	1954
	Tons of 2,000 pounds				
United States	718,622	836,881	937,330	1,252,013	1,460,565
Canada	396,882	447,095	499,758	548,445	560,886
Brazil	—	444	1,196	1,322	1,612
Total America	**1,115,504**	**1,284,420**	**1,438,284**	**1,801,780**	**2,023,063**
Austria	19,828	29,078	40,468	47,924	63,093
France	66,926	100,423	116,987	123,623	132,545
Germany (West)	30,686	81,718	110,740	117,880	142,519
Great Britain	33,004	31,052	31,367	34,626	35,395
Italy	40,862	54,841	58,235	61,137	63,462
Hungary	7,300	16,000	16,500	18,000	20,000
Norway	51,870	55,403	56,330	59,609	68,830
Spain	2,389	4,583	4,532	4,823	5,163
Sweden	4,505	7,441	9,253	10,800	11,861
Switzerland	20,944	29,762	32,518	31,967	28,660
Yugoslavia	2,129	3,117	2,825	3,078	3,854
Total Europe[1]	**280,443**	**413,418**	**479,755**	**512,467**	**575,382**
China, Taiwan	1,941	3,289	4,250	5,407	7,862
India	4,028	4,311	3,994	4,210	5,472
Japan	27,299	40,681	47,026	50,147	58,543
Total Asia[2]	**33,258**	**48,281**	**55,270**	**59,764**	**71,877**
Russia	230,800	231,500	253,500	275,000	305,000
Total	**1,660,015**	**1,977,619**	**2,226,809**	**2,949,011**	**2,975,322**

1. Excluding East Germany.
2. Excluding Korea.

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 Dore 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 Canadian price for antimony was about 32 cents per pound at the end of the year.

TABLE 8. Production of Antimony, 1945-1954

Year	In ores and slags exported		In antimonial lead produced		Total	
	Pounds	$	Pounds	$	Pounds	$
1945	—	—	1,667,951	290,557	1,667,951	290,557
1946	—	—	642,145	96,332	642,145	96,322
1947	—	—	1,150,463	384,255	1,150,463	384,255
1948	—	—	310,062	113,173	310,062	113,173
1949	—	—	158,288	61,020	158,288	61,020
1950	—	—	643,540	215,586	643,540	215,586
1951	5,398,328[1]	817,391	1,303,836	619,322	6,702,164	1,436,713
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

1. Includes antimony in flue dust and Dore slag produced in 1949 and 1950 but not previously recorded.

TABLE 9. Production of Antimony Metal, Consumption and Imports, 1945-1954

Year	Production in Canada	Consumption in Canada[1]	Imports
	Tons of 2,000 pounds		
1945	–	778	517
1946	–	871	455
1947	–	1,189	1,440
1948	–	812	547
1949	–	767	1,292
1950	–	997	1,606
1951	–	740	681
1952	–	667	861
1953	–	803	865
1954	–	805	1,022

Note: Export data are not available from customs' records.
1. Not including antimony in antimonial lead produced at the Trail smelter.

TABLE 10. Consumption of Antimony Metal, by Industries, 1950-1953

Industry	1950	1951	1952	1953
	Tons of 2,000 pounds			
White metal foundries	907	632	594	749
Electrical apparatus plants	68	72	42	23
Brass foundries	14	16	12	10
Jewellery and electro-plate	8	20	19	21
Total accounted for	**997**	**740**	**667**	**803**

TABLE 11. World Production of Antimony (Content of ore)[1], by Countries, 1950-1954

(Taken from the "Minerals Yearbook" published by the United States Bureau of mines.)

Country	1950	1951	1952	1953	1954
	Short tons[2]				
North America:					
Canada[3]	322	3,351	1,165	744	600
Honduras	[4]	[4]	–	–	–
Mexico[3]	6,468	7,522	6,097	4,726	4,610
United States	2,497	3,472	2,160	372	764
Total	**9,287**	**14,345**	**9,422**	**5,842**	**5,974**
South America:					
Argentina	31	45[5]	[6]	[6]	[6]
Bolivia[7]	9,679	13,025	10,809	6,376	5,751
Peru	1,070	1,220	557	1,062	933
Total	**10,780**	**14,290[5]**	**11,420[5]**	**7,500[5]**	**6,700[5]**

TABLE 11. World Production of Antimony (Content of ore)[1], by Countries, 1950-1954 – Concluded

Country	1950	1951	1952	1953	1954
	Short tons[2]				
Europe:					
Austria[8]	451	549	429	342	397
Czechoslovakia	2,200[5]	1,800[5]	1,800[5]	1,800[5]	6
France	455	674	518	331	6
Germany, West	6	53	52	55	6
Greece	386	551	386	606[5]	6
Hungary	6	6	6	6	6
Italy	740	799	692	441	317
Portugal	17	21	155	1	6
Spain	220	184	288	254	176[5]
Yugoslavia (metal)	2,001	1,355	1,465	1,554	1,711
Total[5]	**6,900**	**6,600**	**6,300**	**5,800**	**5,400**
Asia:					
British Borneo: Sarawak	2	–	–	–	–
Burma[5]	7	220	55	22	55
China[5]	6,600	8,800	8,800	8,800	8,800
Iran	254[9]	254[5, 9]	176	265	6
Japan	177	247	230	354	291
Thailand (Siam)	96	72	77	50	78
Turkey	1,775	2,984	1,274	951	1,080
Total[5]	**9,000**	**13,000**	**11,000**	**10,000**	**10,000**
Africa:					
Algeria	1,318	1,391	1,456	1,995	2,595
French Morocco	759	1,055	925	64	429
Southern Rhodesia	26	68	110	26	72
Spanish Morocco	389	235	475	341	330[5]
Union of South Africa	9,161	17,480	7,949	3,009	9,480
Total	**11,653**	**20,229**	**10,915**	**5,435**	**12,800[5]**
Oceania:					
Australia	250	463	268	239	126
New Zealand	–	–	7	12	6
Total	**250**	**463**	**275**	**251**	**140[5]**
World total (except U.S.S.R.) estimate	**50,000**	**70,000**	**50,000**	**35,000**	**40,000**

1. Approximate metal content of ore produced, exclusive of antimonial lead ores.
2. This table incorporates a number of revisions of data published in previous chapters.
3. Includes antimony content of antimonial lead.
4. Negligible.
5. Estimate.
6. Data not available; estimate included in total.
7. Exports.
8. Excludes Soviet zone, estimates for which are included in the totals.
9. Year ended March 20, of year following that stated.

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 to 1954.

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 1954.

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-columbite. 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 12. World Production of Beryl, by Countries, 1949-1953

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country [1]	1949	1950	1951	1952	1953
	Metric tons [2]				
Afghanistan	—	7	2	—	—
Argentina	—	—	—	499[3]	1,373[3]
Australia	36	23	114	89	127
Belgian Congo	—	—	—	—	7
Brazil (exports)	3,078	2,625	1,533	2,523	2,160
Canada	—	26[3]	—	—	—
Chile	—	—	—	[5]	[5]
France	2	3	[5]	—	[5]
French Morocco	211	56	84	129	33
India	[5]	[5]	215	550[6]	[5]
Korea, Republic of	—	—	[5]	[4]	4
Madagascar	27	486	530	397	468
Mozambique	136	264	230	208	250
Northern Rhodesia	—	5	4	8	5
Norway	9[3]	—	—	—	—
Portugal	3	52	102	93	378
Southern Rhodesia	23	846	1,007	1,076	1,609
South West Africa	239	659	753	537	535
Surinam	—	—	—	—	2
Tanganyika	1	—	—	—	—
Uganda	34	71	2	3	50
Union of South Africa	223	844	593	375	482
United States (mine shipments)	431	507	439	467	681
Total (estimate)	**4,587**	**6,651**	**5,720**	**6,850**	**8,500**

1. In addition to the countries listed, beryl has been produced in a number of countries for which no production data are available, except for U.S.S.R.; their aggregate output is not significant.
2. This table incorporates a number of revisions of data published in previous beryl chapters.
3. United States imports.
4. Less than 0.5 ton.
5. Data not available; estimate included in total.
6. Estimate.

Bismuth

Bismuth was produced at the Trail smelter of the Consolidated Mining and Smelting Company of Canada, Limited, from the firm's own ores and also from custom ores. In Quebec the Molybia Corporation, Limited, produced bismuth oxychloride concentrates and metallic bismuth.

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 solders, 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, 1954, was $2.25 per pound, in ton lots.

TABLE 13. Production of Primary Bismuth in all Forms[1], 1945-1954

Year	Pounds	$	Year	Pounds	$
1945	189,815	260,047	1950	191,621	431,147
1946	240,504	336,706	1951	230,298	543,504
1947	284,372	560,213	1952	162,373	347,224
1948	240,242	480,484	1953	117,366	209,557
1949	102,913	210,972	1954	258,675	572,183

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

TABLE 14. Production of Bismuth Metal, Consumption, Imports and Exports, 1945-1954

Year	Production	Domestic consumption	Exports[1]	Imports
	Tons of 2,000 pounds			
1945	95	35	41	—
1946	120	40	95	—
1947	142	71	61	2
1948	120	44	79	80
1949	105[2]	18	89	136
1950	97[2]	33	57	—
1951	104[2]	54	45	—
1952	71[2]	53	17	1
1953	36[2]	34	—	—
1954	113[2]	37	—	—

1. Shipped for export by Canadian producers.
2. Includes bismuth from foreign ores.

TABLE 15. Consumption of Bismuth Metal, by Industries, 1950-1953

Industry	1950	1951	1952	1953
	Tons of 2,000 pounds			
Medicinals and pharmaceuticals	14	29	26	8
White metal foundries	14	18	20	21
Miscellaneous	5	7	7	5
Total	**33**	**54**	**53**	**34**

TABLE 16. World Production of Bismuth, by Countries, 1950-1954

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country[1]	1950	1951	1952	1953	1954
			Pounds[2]		
North America:					
Canada (metal)[3]	191,617	362,571	162,371	117,364	272,696
Mexico[3]	580,339	745,100	895,220	739,209	795,900
United States	4	4	4	4	4
South America:					
Argentina: Metal	6	6	1,100[5]	6	6
In ore	6	6	1,100[5]	6	6
Bolivia (in ore, bullion, exported)[7]	53,887	150,788	35,119	138,731	101,467
Peru[3]	500,116	579,049	714,828	631,990	691,726
Europe:					
France (in ore)	172,000	198,000	190,000	159,000	6
Spain (metal)	25,009	33,466	27,044	56,006	50,700[5]
Sweden	—	—	6	6	6
Yugoslavia (metal)	124,075	193,476	217,600	217,047	241,842
Asia:					
China (in ore)					
Japan (metal)	72,880	92,615	96,068	110,159	128,000
Korea, Republic of	6	27,600	243,000	529,000	254,000
Africa:					
Belgian Congo (in ore)	1,473	496	1,036	—	6
South West Africa (in ore)[6]	15,900	200	—	100	6
Uganda	6,385	6,385	6,200	1,100	400
Union of South Africa	16,863	7,019	3,391	2,200[5]	6
Australia (in ore)[8]	2,015	2,575	3,153	900	6
Total (estimate)	**3,100,000**	**3,900,000**	**4,100,000**	**4,200,000**	**3,800,000**

1. Bismuth is believed to be produced also in Brazil, Germany, Romania, U.S.S.R. and United Kingdom. Production figures are not available for these countries, but estimates are included in total.
2. This table incorporates a number of revisions of data published in previous bismuth chapters.
3. Refined metal plus bismuth content of bullion exported.
4. Production included in total; Bureau of Mines not at liberty to publish separately.
5. Estimate.
6. Data not available; estimate included in total.
7. Excludes bismuth content of tin concentrates exported.
8. Partly estimated. Excludes content of some bismuth-tungsten concentrates.

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 of cadmium 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. The output of cadmium in all forms amounted to 543 tons during 1954.

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, 1954, was $1.70 per pound.

TABLE 17. Production of Cadmium in all Forms, 1945-1954

Year	British Columbia and Yukon		Manitoba and Saskatchewan		Canada	
	Pounds	$	Pounds	$	Pounds	$
1945	510,432	505,328	135,632	134,275	646,064	639,603
1946	636,315	776,304	166,333	202,926	802,648	979,230
1947	545,638	938,497	172,896	297,382	718,534	1,235,879
1948	617,226	1,126,437	148,864	271,677	766,090	1,398,114
1949	665,449	1,364,170	181,092	371,239	846,541	1,735,409
1950	706,950	1,640,124	141,456	328,176	848,406	1,968,302
1951	1,179,752	3,161,735	147,168	394,410	1,326,920	3,556,145
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

TABLE 18. Consumption and Exports of Cadmium Metal, 1945-1954

Year	Production	Domestic consumption	Exports
	Tons of 2,000 pounds		
1945	319	87	175
1946	401	96	296
1947	359	72	309
1948	383	92	275
1949	423	111	317
1950	419[1]	116	349
1951	633[1]	146	460
1952	410[1]	74	310
1953	489[1]	133	485
1954	529[1]	113	388

1. Includes cadmium recovered from foreign ores.

Note. Statistics on imports are not available.

TABLE 19. World Production[1] of Cadmium, by Countries, 1950-1954

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country	1950	1951	1952	1953	1954
	Thousands of pounds				
Australia	659	517	641	665	515
Belgian Congo	65	54	45	71	139
Belgium[2]	805	990	1,210	1,040	1,100
Canada	848	1,327	949	1,118	1,027
France	158	187	195	283	313
Germany, West	26	154	141	227	618
Italy	165	441	293	401	448
Japan	199	259	367	459	501
Mexico[3]	1,519	1,969	1,618	2,103	1,488[2]
Norway	174	221	163	197	178
Peru	3	—	38	23	66
Poland[2]	530	530	530	530	530
South West Africa[4]	1,344	1,434	1,112	1,194	1,620
Spain	10	9	12	16	12[2]
U.S.S.R.[2]	150	180	200	200	220
United Kingdom	262	326	347	380	315
United States: Metal	8,849	8,114	8,388	9,682	9,416
Cadmium compounds (Cd. content)	341	197	179	85	136
Total (estimate)	**13,250**	**16,910**	**13,700**	**15,380**	**15,540**

1. This table incorporates a number of revisions of data published in previous chapters.
2. Estimate.
3. Cadmium content of flue dust exported for treatment elsewhere; represents in part, shipments from stocks on hand. To avoid duplication of figures, data are not included in the total.
4. Cadmium content of concentrates exported for treatment elsewhere. To avoid duplication of figures, data are not included in the total.

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. In 1954 the value of output is included with 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 difficultly reducible metals, such as chromium, thorium, uranium, and zirconium.

In 1954 the New York price for calcium, 97-98 per cent as cast, was $2.05 per pound.

TABLE 20. Production (shipments) of Calcium Metal, 1945-1954

Year	Pounds	$
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
1950-1954	(Not available for publication)	

Cerium

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 1954. 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 superchargers. 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, 1954, for chrome ore, 48 per cent Cr_2O_3, was $43.00—$47.00 per long ton, f.o.b. Atlantic ports.

TABLE 21. Production of Chromite, 1945-1954

Year	Short tons	$	Year	Short tons	$
1945	5,755	160,752	1950	—	—
1946	3,110	61,123	1951	—	—
1947	2,162	42,159	1952	—	—
1948	1,715	33,568	1953	—	—
1949	361	7,148	1954	—	—

TABLE 22. World Production of Chromite, by Countries, 1950-1954

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines.)

Country[1]	1950	1951	1952	1953	1954
	Short tons[2]				
North America:					
Canada	—	—	—	—	—
Cuba	72,554	87,154	68,132	77,205	60,000[3]
Guatemala	319	1,254	116	441	110[3]
United States	404	7,056	21,304	58,817	159,743
Total	**73,277**	**95,464**	**89,552**	**136,463**	**220,000**
South America:					
Argentina	—	—	—	—	[4]
Brazil[5]	3,557	2,663	2,920	4,000[3]	3,000[3]
Total	**3,557**	**2,663**	**2,920**	**4,000[3]**	3,000[3]
Europe:					
Albania	57,320[3]	[4]	[4]	[4]	[4]
Greece	13,923	27,925	35,452	40,520	29,549
Portugal	50	36	119	5	—
U.S.S.R.[3,6]	500,000	600,000	600,000	600,000	600,000
Yugoslavia	126,475	109,333	118,192	139,950	137,216
Total	**715,000**	**820,000**	**835,000**	**870,000**	**855,000**
Asia[6]:					
Afghanistan	606	83	—	—	—
Cyprus (exports)	20,328	13,948	14,867	9,115	10,087
India	18,737	18,706	40,530[7]	72,543	55,000[3]
Iran	—	[4]	9,728	22,046	20,000[3]
Japan	36,331	45,134	51,975	41,418	35,821
Pakistan	20,300	19,848	19,040	25,760	24,527
Philippines	276,141	368,801	599,121	614,086	442,230
Turkey	465,758	682,793	889,466	1,005,883	619,001
Total[6]	**838,201**	**1,151,518**	**1,624,727**	**1,790,851**	**1,207,000[3]**
Africa:					
Egypt	40	—	—	231	584
Sierra Leone	8,287	18,139	26,312	27,277	16,667[5]
Southern Rhodesia	321,351	330,987	355,679	463,028	442,506
Union of South Africa	547,103	600,763	639,366	798,562	706,935
Total	**876,781**	**949,889**	**1,021,357**	**1,289,098**	**1,166,692**
Oceania:					
Australia	998	1,545	1,565	3,070	2,000[3]
New Caledonia	93,477	97,876	118,675	133,446	92,818
Total	**94,475**	**99,421**	**120,240**	**136,516**	**94,818**
World total (estimate)	**2,600,000**	**3,100,000**	**3,700,000**	**4,200,000**	**3,500,000**

1. In addition to countries listed, Bulgaria and Romania produce chromite, but data on output are not available; estimates are included in total.
2. This table incorporates a number of revisions of data in previous chromite chapters.
3. Estimate.
4. Data not available; estimate included in total.
5. Exports
6. Output from U.S.S.R. in Asia included with U.S.S.R. in Europe.
7. Does not include 21,603 tons of low-grade ore accumulated from production from 1943 to 1948.

TABLE 23. Imports of Chrome Ores, 1945-1954

Year	Tons	$	Year	Tons	$
1945	60,691	1,154,985	1950	119,325	2,192,555
1946	15,836	269,248	1951	146,998	3,762,874
1947	98,322	3,138,229	1952	148,343	5,146,860
1948	69,183	1,937,692	1953	118,092	3,006,549
1949	66,246	1,664,082	1954	37,566	571,984

TABLE 24. Imports of Chrome Ores, by Principal Countries of Supply, 1953 and 1954

Imported from	1953		1954	
	Tons	$	Tons	$
Union of South Africa	48,408	685,776	20,883	267,347
Southern Rhodesia	16,345	537,498	6,112	120,772
Turkey	2,240	108,270	—	—
United States	32,059	1,423,080	1,562	66,540
Philippines	19,040	251,925	8,960	117,325
Total	118,092	3,006,549	37,566	571,984

Indium

Indium production in 1954 amounted to 477 ounces valued at $1,278 as compared with 6,752 ounces valued at $9,588 in 1953. 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 noncorrosive 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 use about 1927 was as 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 1954 the quoted price of indium at New York was $2.25 per ounce troy. The price has remained at this level for the past nine years.

TABLE 25. Production of Indium, 1942-1954

Year	Troy ounces	$	Year	Troy ounces	$
1942	470	4,710	1951	582	1,368
1943-1948	—	—	1952	404	909
1949	689	1,550	1953	6,752	9,588
1950	4,952	12,083	1954	477	1,278

Iron Ore

During 1954 the producers of iron ore shipped 7,361,598 short tons valued at $49,666,507 compared with 6,509,818 short tons worth $44,102,944 at the shipping ports, in 1953. Included in the total are direct-shipping ore, sinter and magnetic concentrates. By-products from treating pyrite are excluded to avoid duplication, as the pyrite is measured at the mine before treatment statistics on the products of pyrite treatment are included in the manufacturing industries.

At Wabana, Newfoundland, the modernization and expansion program continued both underground and on the surface. In the Labrador—New Quebec area production commenced in June, 1954, and shipments were made to the port at Sept Iles. The first ship was loaded at Sept Iles at the end of July. The stripping of the limestone from the magnetite ore body at Marmora, Ontario, was nearly completed. At Steep Rock production came from the Hogarth open-pit mine and the Errington underground mine was ready to produce. In British Columbia mining was temporarily suspended at the Iron Hill mine because of the lack of a market. Shipments from the Texada mines continued at about the same rate.

Detailed technical information on the mining and development of the iron ore industry may be found in the annual report of the Department of Mines and Technical Surveys, Ottawa.

TABLE 26. Principal Statistics for the Iron Ore Mining Industry, Significant Years 1921-1954

Year	Establishments	Employees	Earnings	Cost of fuel and electricity	Cost of process supplies and containers	Gross value of production	Net value[1] of production
	No.	No.	$	$	$	$	$
1921							
1929	Data on iron ore prior to 1929 included in titaniferous iron ore and titanium ore						
1931							
1933							
1937	No iron ores, known as such, were mined in Canada for some years prior to 1939						
1939	2	216	334,215	81,435	63,450	341,594	196,709
1941	4	272	475,741	267,167	103,161	1,426,057	825,357
1944	8	679	1,462,453	642,761	200,438	1,909,608	789,756
1946	11	823	1,944,436	687,011	604,081	6,822,947	3,466,760
1949	13	3,257	8,851,746	1,160,183	1,284,198	21,203,907	15,430,743
1950	14	3,102	8,230,685	1,342,198	3,217,403	23,413,547	15,082,928
1951	20	3,638	11,357,690	1,806,356	2,920,993	31,141,112	21,870,765
1952	27	4,473	15,955,201	2,240,932	3,850,499	33,744,311	23,005,559
1953	25	5,242	21,073,712	2,875,190	6,214,680	44,102,944	30,066,883
1954	32	4,981	18,907,608	2,802,280	8,681,805	49,666,507	35,051,077

1. Gross value of production, less value of fuel, electricity, process supplies and freight.

TABLE 27. Production of Iron Ore[1], 1945-1954

Year	Short tons	Value	Year	Short tons	Value
		$			$
1945	1,135,444	3,635,095	1950	3,605,261	23,413,547
1946	1,549,523	6,822,947	1951	4,680,510	31,141,112
1947	1,919,366	9,313,201	1952	5,271,849	33,744,311
1948	1,337,244	7,487,611	1953	6,509,818	44,102,944
1949[2]	3,675,096	21,203,907	1954	7,361,598	49,666,507

1. Exclusive of titanium-bearing ores.
2. Newfoundland iron ore included for first time.

TABLE 28. Imports and Exports of Iron Ore, 1945 - 1954

Year	Imports			Exports
	From United States	From Newfoundland	Total[1]	
	Tons of 2,000 pounds			
1945	2,988,484	736,665	3,739,867	771,495
1946	1,686,236	518,566	2,281,677	1,145,256
1947	3,126,307	755,612	3,944,550	1,749,976
1948	3,392,063	820,692	4,300,163	1,070,277
1949	2,350,149	42,285	2,517,235	2,550,299
1950	2,975,659	—	3,070,557	2,227,475
1951	3,690,269	—	3,831,413	3,225,767
1952	4,106,737	—	4,267,653	3,846,998
1953	4,008,810	—	4,167,571	4,819,975
1954	2,935,237	—	3,035,191	6,126,938

1. Includes some ore from other countries, principally Brazil, Sweden and Liberia.

TABLE 29. Iron Ore Charged to Iron Blast Furnaces, 1945 - 1954

Year	Canadian	Imported	Total
	Tons of 2,000 pounds		
1945	235,757	2,797,697	3,033,454
1946	358,173	2,167,900	2,526,073
1947	252,085	3,420,890	3,672,975
1948	193,935	3,716,683	3,910,618
1949	1,107,250	2,738,816	3,846,066
1950	1,398,712	2,774,801	4,173,513
1951	1,476,440	3,168,581	4,645,021
1952	1,404,797	3,477,356	4,882,153
1953	1,269,815	3,965,835	5,235,650
1954	750,000	2,988,000	3,738,000

Note. Newfoundland ore, classified as Canadian in 1949 and thereafter, was included in imported ore in previous years.

TABLE 30. World Production of Iron Ore, by Countries

(Taken from "Minerals Yearbook" published by the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
	Thousands of metric tons[2]				
North America:					
Canada	3,334	3,271	4,246	4,783	5,898
Cuba	12	12	17	101	229
Mexico	363	420	460	523	547
United States	86,301	99,619	118,375	99,490	119,889
South America:					
Argentina[3]	40	40	54	60	80
Brazil	1,888	1,987	2,407	3,044	3,145
Chile[4]	2,597	2,976	3,252	2,209	2,165
Venezuela	—	198	1,270	1,970	2,296
Peru	—	—	—	—	1,001

TABLE 30. World Production of Iron Ore, by Countries – Concluded

(Taken from "Minerals Yearbook" published by the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
	Thousands of metric tons[2]				
Europe:					
Austria	1,488	1,859	2,370	2,653	2,757
Belgium	42	46	79	135	99
Bulgaria[3]	—	27	43	60	92
Czechoslovakia	1,400[3]	1,784[3]	19,642[3]	2,315[3]	2,500[3]
France	31,424	30,016	35,201	40,716	42,368
Germany: East[3]	250	386	592	852	1,250
West	9,112	10,883	12,923	15,404	14,619
Greece	—	5	53	137	86
Hungary	339	368	400[3]	450[3]	500[3]
Italy	554	476	553	790	933
Luxembourg	4,137	3,845	5,625	7,245	7,170
Norway	275	298	332	769	1,182
Poland	699	790	901	1,027	1,345
Portugal	—	—	21	89	123
Rumania[3]	324	395	478	654	661
Spain	1,876	2,088	2,389	2,863	2,956
Sweden	13,729	13,611	15,383	16,949	17,128
Switzerland	70	55	86	107	105
U.S.S.R.	35,000	44,000	48,000	50,000	55,000
United Kingdom	13,612	13,171	15,014	16,493	16,072
Yugoslavia	835	826	581	676	795
Asia:					
China[3]	500	2,000	3,000	4,000	5,000
Hong Kong	60	172	164	130	125
India	2,854	3,005	3,716	3,989	3,617
Japan[6]	794	927	1,168	1,394	1,541
Korea, Republic of	—	—	—	17	19
Korea, North	[7]	[7]	[7]	[7]	[7]
Malaya	9	507	860	1,072	1,080
Philippines	370	599	903	1,170	1,218
Portuguese India	151	131	436	494	803[8]
Thailand	—	3	6	3	8
Turkey	211	234	226	482	506
U.S.S.R.	[5]	[5]	[5]	[5]	[5]
Africa:					
Algeria	2,538	2,573	2,823	3,096	3,388
French Guiana	—	—	—	—	399
French Morocco	357	323	533	651	506
Liberia	—	—	171	904	1,316[8]
Northern Rhodesia	2	—	—	6	2
Sierra Leone	1,104	1,185	1,159	1,183	1,390
Southern Rhodesia	51	57	52	65	63
Spanish Morocco	893	951	937	934	986
Tunisia	712	758	923	977	1,057
Union of South Africa	1,242	1,189	1,421	1,759	1,971
Oceania:					
Australia	1,484	2,403	2,475	2,954	3,352
New Caledonia	—	15	—	3	—
Total (estimate)	**223,000**	**250,000**	**294,000**	**298,000**	**331,000**

1. In addition to countries listed, Egypt and Madagascar report production in past years, but quantity produced is believed insufficient to affect estimate of world total.
2. This table incorporates a number of revisions of data published in previous iron ore chapters.
3. Estimate.
4. Production of Tofo mines.
5. U.S.S.R. in Asia included with U.S.S.R. in Europe.
6. Includes iron sand production as follows: 1949, 33,120 tons; 1950, 101,544 tons; 1951, 255,984 tons; 1952, 322,008 tons; and 1953, 437,868 tons.
7. Data not available; estimate included in total.
8. Exports.

TABLE 31. Estimated Capital and Repair Expenditures, 1950-1954

Year	Capital expenditures			Repair expenditures			Capital and repair expenditures		
	Construction	Machinery	Total	Construction	Machinery	Total	Construction	Machinery	Total
	Thousands of dollars								
1950	5,813	6,146	11,959	135	4,409	4,544	5,948	10,555	16,503
1951	8,194	4,309	12,503	188	3,216	3,404	8,382	7,525	15,907
1952	18,034	12,102	30,136	1,073	2,507	3,580	19,107	14,609	33,716
1953	19,067	29,073	48,140	825	4,148	4,973	19,892	33,221	53,113
1954[1]	26,766	9,717	36,483	496	3,800	4,296	27,262	13,517	40,779

1. Preliminary estimates.

TABLE 32. Employees and Their Earnings in the Iron Ore Mining Industry, 1950-1954

Year	Number of employees					Number of man-hours worked (all employees)	Earnings		
	Office and administrative		Workmen		Total		Office and administrative	Workmen	Total
	Male	Female	Male	Female					
							$	$	$
1950	242	26	2,794	40	3,102	6,799,463	969,096	7,261,589	8,230,685
1951	273	29	3,298	38	3,638	7,382,442	1,141,375	10,216,315	11,357,690
1952	446	40	3,942	45	4,473	12,224,191	1,921,935	14,033,266	15,955,201
1953	504	67	4,631	40	5,242	12,000,682	2,701,636	18,372,076	21,073,712
1954	402	72	4,464	43	4,507	10,063,564	1,903,869	17,003,739	18,907,608

TABLE 33. Workmen in the Iron Ore Mining Industry, by Months, 1953 and 1954

Month	1953	1954					
	Total	Mine			Mill or plant		Total
		Surface		Underground	Male	Female	
		Male	Female	Male			
	Number						
January	4,214	2,077	41	2,203	184	4	4,509
February	4,183	2,003	42	2,202	185	4	4,436
March	4,263	1,966	46	2,214	183	4	4,413
April	4,280	1,974	45	2,170	182	4	4,375
May	4,432	2,089	40	2,114	179	3	4,425
June	4,753	2,346	32	2,045	191	3	4,617
July	4,750	2,388	39	1,952	204	3	4,586
August	5,082	2,500	39	1,974	204	3	4,720
September	5,066	2,431	42	1,963	207	3	4,646
October	4,993	2,283	40	1,975	204	3	4,505
November	4,959	2,117	39	1,967	181	3	4,307
December	4,908	1,847	35	1,496	155	4	3,537
Average	**4,671**	**2,253**	**40**	**2,023**	**188**	**3**	**4,507**
Man-hours worked	10,574,017						8,941,988

Magnesium

Magnesium is produced from dolomite by the Dominion Magnesium Limited, Haley, Ontario. This firm uses the Pidgeon process. At Arvida, Quebec, the Aluminum Company of Canada Limited treats brucite, brought from Wakefield, Quebec, by converting it to magnesium chloride and thence to magnesium metal.

TABLE 34. Production of Primary Magnesium Metal, 1943-1954

Year	Quebec		Ontario		British Columbia		Canada	
	Pounds	$	Pounds	$	Pounds	$	Pounds	$
1943	—	—	7, 153, 974	2, 074, 652	—	—	7, 153, 974	2, 074, 652
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
1947-1954	Not available for publication							

TABLE 35. Consumption of Magnesium Metal, 1950-1953

—	1950	1951	1952	1953
	Pounds			
In white metal alloy foundries	706, 118	1, 884, 331	1, 420, 585	1, 796, 134
In brass and bronze foundries	69, 543	270, 325	113, 427	147, 671
In aluminum products	298, 544	508, 650	703, 873	883, 973
Total accounted for	**1, 074, 205**	**2, 663, 306**	**2, 237, 885**	**2, 827, 778**

TABLE 36. World Production of Magnesium Metal, by Countries, 1950-1954

(Taken from the "Minerals Yearbook" published by the United States Bureau of Mines)

Country[1]	1950	1951	1952	1953	1954
	Short tons[1]				
Canada	1, 764	4, 409	5, 500	6, 600[2]	6, 600[2]
China, Manchuria	[3]	[3]	[3]	[3]	[3]
France	449	1, 263	1, 202	1, 100	1, 243
Germany, West	—	—	—	—	90
East[2]	1, 100	1, 100	1, 100	1, 100	1, 100
Italy	134	746	1, 076	1, 595	1, 836
Norway	—	338	338	3, 853	5, 183
Switzerland	276	276	331	275[2]	—
United Kingdom[4]	3, 307	5, 512	5, 071	5, 936	5, 577
United States	15, 726	40, 881	105, 821	93, 075	69, 729
U.S.S.R.[2]	25, 000	35, 000	45, 000	55, 000	45, 000
Total (estimate)	**50, 000**	**90, 000**	**170, 000**	**170, 000**	**140, 000**

1. This table incorporates a number of revisions of data published in previous magnesium chapters.
2. Estimate.
3. Data not available; estimate included in total.
4. Primary metal and remelt alloys.

Manganese

Production of manganese ore in Canada has been spasmodic due to the limited number of known deposits. No production was recorded for 1954.

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 80 to 82 cents per long ton unit, c.i.f., U.S. ports.

TABLE 37. Production of Manganese Ore, 1943-1954

Year	Tons	Value	Year	Tons	Value
		$			$
1943	48	985	1948	3	86
1944	–	–	1949	–	–
1945	–	–	1950	–	–
1946	–	–	1951	–	–
1947	225	7,875	1952-1954	–	–

TABLE 38. Imports of Manganese Oxide, 1945-1954

Year	Tons	$	Year	Tons	$
1945	198,277	4,571,592	1950	135,697	4,993,912
1946	144,023	2,484,707	1951	222,082	9,078,011
1947	223,503	6,145,568	1952	194,405	8,273,722
1948	230,298	6,449,819	1953	66,682	2,719,863
1949	137,854	4,475,522	1954	48,962	2,277,043

TABLE 39. Imports of Manganese Oxide, by Principal Countries of Supply, 1951-1954

–	1951	1952	1953	1954
	Tons			
From:				
Belgium	–	–	12,340	2,240
Cuba	–	3,864	–	6,940
Gold Coast	88,687	63,112	10,035	5,600
India	17,467	13,954	11,043	1,794
France	–	–	–	5
United States	95,086	74,393	31,709	32,304
United Kingdom	106	50	55	75
Brazil	8,288	5,152	–	–
French Oceania	7,744	–	–	–
Turkey	4,704	25,688	–	–
Union of South Africa	–	7,520	1,500	–
Philippines	–	672	–	–
Total imports	**222,082**	**194,405**	**66,682**	**48,962**

TABLE 40. World Production of Manganese Ore, by Countries[1], 1949-1953

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines.)

Country[1]	1949	1950	1951	1952	1953
	Metric tons[2]				
North America:					
Canada (shipments)	—	—	—	—	—
Cuba	62,503	79,209	154,091	251,677	353,218[3]
Mexico	53,900	32,400	79,190	141,696	244,816
United States (shipments)	114,427	121,971	95,260	104,670	142,914
South America:					
Argentina	[4]	1,200	2,500	[4]	[4]
Brazil (exports)	149,896	148,339	119,900	172,510	166,101
Chile	28,870	33,530	36,578	48,600[3]	60,000[3]
Peru	—	762	946	2,215	3,200[3]
Europe:					
Greece	150	320	10,592	22,924	12,533
Hungary (concentrates)[3]	40,000	40,000	40,000	40,000	40,000
Italy	24,302	19,434	28,557	40,570	39,156
Portugal	508	798	7,615	11,065	12,546
Rumania	66,816	[4]	[4]	[4]	[4]
Spain	18,650	19,002	20,790	28,493	28,968
Sweden	—	58	[4]	[4]	[4]
U.S.S.R.	1,500,000	2,000,000	2,500,000	2,500,000	3,500,000[5]
Yugoslavia	13,837	13,338	12,868	12,687	10,017
Asia:					
Burma	—	—	2,000[3]	6,604	6,718
China	[4]	[4]	[4]	[4]	[4]
India	656,190	897,100	1,304,536	1,485,733	1,752,700[3]
Indonesia	—	—	—	7,823	16,986
Iran	4,200[3,6]	9,360[3,6]	[4]	9,327	6,000[3]
Japan	100,000	134,066	198,000	207,376	183,899
Korea, Republic of	[4]	100	2,247	7,416	3,058
Malaya	—	72[7]	195[7]	—	—
Philippines	26,283	29,867	22,343	20,627	21,508
Portuguese India	16,220	38,220	86,793	111,066	150,000
Turkey	22,576	32,178	50,517	106,395	74,884
Africa:					
Angola	18,600	9,308	46,192	55,094	65,864
Belgian Congo	12,247	16,990	70,945	127,978	216,664
Egypt	138,568	152,169	—	—	—
French Morocco	233,825	287,265	372,233	426,316	429,517
Gold Coast (exports)[8]	752,963	722,784	819,018	806,934	757,963
Nothern Rhodesia	—	—	1,280	3,989	7,243
Southern Rhodesia	166	—	—	1,433	—
South West Africa	—	993	6,560	26,507	36,881
Spanish Morocco	653	36	1,122	3,635	3,419
Tunisia	—	—	—	—	—
Union of South Africa	655,175	790,937	758,870	874,637	827,656
Oceania:					
Australia	13,303	15,108	8,096	7,182	19,083
Fiji	102	203	641	2,042	[4]
New Caledonia	2,100	5,392	20,135	16,850	4,715
New Zealand	310	358	408	324	294
Papua	163[9]	22	41	[4]	43
Total (estimate)	**4,600,000**	**5,600,000**	**7,000,000**	**7,800,000**	**9,300,000**

1. In addition to countries listed, Bulgaria and North Korea have produced manganese ore; date of output is not available, but estimates for them are included in the totals. Czechoslovakia and Egypt report production of manganese ore, but it is believed that the product so reported averages less than 30 per cent Mn and therefore would be ferruginous manganese ore under the classification used in this report, hence the output is not included in this table.
2. This table incorporates a number of revisions of data published in previous Minerals Yearbook manganese chapters.
3. Estimate.
4. Data not available; estimate included in total.
5. The 1953 production estimated for ore of 35 per cent or more manganese content.
6. Year ending March 20, of year following that stated. 1952 and 1953 are calendar years.
7. Exports.
8. Dry weight.
9. Year ending June 30, of year stated.

Mercury

There has been no production of mercury in Canada since September, 1944, and all shipments since then have been from producers' stocks. 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 price of mercury during 1954 on the New York market was quoted at $187 per flask of 76 lb. in January, $210 in April, $280 in July, $325 in October and $322 at the end of the year.

TABLE 41. Production of Mercury, 1940-1954

Year	Pounds	$	Year	Pounds	$
1940	153,830	369,317	1943	1,690,240	4,559,200
1941	536,304	1,335,697	1944	735,908	1,210,375
1942	1,035,914	2,943,807	1945-1954	Nil	—

TABLE 42. Production of Mercury, Consumption, Imports and Exports, 1945-1954

Year	Production	Consumption	Imports	Exports
	Pounds			
1945	—	100,700	27,101	261,720
1946	—	102,320	152,719	57,005
1947	—	344,516	412,649	17,084
1948	—	552,216	803,878	175
1949	—	460,577	278,069	8
1950	—	166,716	614,005	8,100
1951	—	171,886	308,172	58,235
1952	—	159,216	144,439	1,500
1953	—	191,976	196,412	7,018
1954	—	203,756	244,783	6,310

TABLE 43. Consumption of Mercury by Principal Uses, 1950-1954

Industry	1950	1951	1952	1953	1954
	Pounds				
Pharmaceuticals and fine chemicals	56,088	32,041	25,864	46,487	46,968
Heavy chemicals	88,094	104,483	103,385	113,513	145,312
Electrical apparatus	6,534	19,362	13,967	11,598	4,104
Gold mines[1]	6,000	6,000	6,000	6,000	3,000
Miscellaneous[1]	10,000	10,000	10,000	14,378	4,372
Total	**166,716**	**171,886**	**159,216**	**191,976**	**203,756**

1. Estimated.

TABLE 44. World Production of Mercury, by Countries, 1949-1953

(Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
	Flasks of 34.5 kilograms or 76 pounds				
Algeria	115	—	—	—	—
Austria	6	44	31	16	[2]
Bolivia, (exports)	—	—	19	—	[2]
Chile	754	319	114	174	[2]
China	290[3]	1,450[3]	4,000[3]	4,000[3]	5,000[3]
Czechoslovakia	800[3]	725[3]	725[3]	725[3]	[2]
Honduras	—	—	11	—	[2]
Italy	44,527	53,346	53,839	55,869	51,373
Japan	2,461	1,312	1,847	3,080	6,289
Mexico	5,250	3,713	8,064	8,731	11,632
Spain	32,289	51,808	44,480	39,135	45,000[3]
United States	9,930	4,535	7,293	12,547	14,337
Yugoslavia	12,764	14,368	14,649	14,620	14,272
U.S.S.R.[3]	11,600	11,600	11,600	11,600	12,000
Total[3]	**121,000**	**143,000**	**147,000**	**151,000**	**161,000**

1. Mercury is also produced in Romania and U.S.S.R., but production data are not available; estimates included in total.
2. Data not yet available; estimates included in totals.
3. Estimate.

Molybdenum

Although there are several deposits of molybdenite in Canada the only operating mine was in La Corne township, Quebec. The ore from this mine was milled by Molybdenite Corporation of Canada Limited, to yield molybdenite concentrates and bismuth oxychloride. These products were exported for further treatment.

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 airplanes. They are used in the automobile industry; in high-grade structural die and stainless steels; 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 45. Production of Molybdenite, 1945-1954

Year	Ores milled	Ores and concentrates shipped or used		Total MoS_2 content of[2] shipments
	Tons	Tons	$	Pounds
1945	80,575	489.1	411,663	839,419
1946	84,280	368.2	295,640	676,844
1947	83,665	396.0	309,048	759,795
1948	—	173.5	137,143	304,762
1949	—	—	—	—
1950	—	108.9[1]	60,059	103,550
1951	40,139	241	228,958	381,596
1952	82,294	331	409,831	505,964
1953	41,379	184	215,527	323,907
1954	105,924	411	457,912	752,417

1. Shipped from stockpile.

TABLE 46. World Production of Molybdenum in Ores and Concentrates, by Countries, 1949-1953
(Taken from the "Minerals Yearbook" of the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
	Metric tons				
Australia	4	3	3	3	3
Austria	9	18	19	22	2
Canada	—	28	104	138	42
Chile	558	992	1,725	1,644	1,375
China: Manchuria	2	2	2	2	2
Other provinces	2	2	2	2	2
Finland	—	—	—	—	2
France	—	—	—	—	2
Hong Kong	—	—	3	3	1
Japan	—	13	54	87	170
Korea, Republic of	11	—	5	7	9
Mexico	—	—	—	—	2
Norway	71	67	125	122	2
Peru	2	1	3	3	2
Sweden	5	6	2	—	2
United States	10,918	12,918	17,625	19,622	25,965
Total (estimate)	**11,400**	**14,500**	**20,300**	**22,200**	**28,200**

1. Molybdenum is also produced in North Korea, Romania, Spain, Yugoslavia and U.S.S.R., but production data are not available. Estimates are included in the total.
2. Data not yet available; estimate included in total.
3. Less than 0.5 ton.

Pitchblende

Radioactive ores of uranium are mined at Great Bear Lake, in the Northwest Territories and at Lake Athabaska, Saskatchewan.

Statistics on pitchblende ores and products have not been available from 1941 to 1953. The value of pitchblende products includes uranium oxides and salts, radium salts, also some cobalt and silver.

TABLE 47. Canadian Refinery Production of Pitchblende Products, 1933-1954

Year	$	Year	$
1933[1]	247,900	1938	1,045,458
1934	159,400	1939	1,121,553
1935	413,700	1940	410,176
1936	605,500	1941-1953	2
1937	876,540	1954	26,373,052

1. First production.
2. Not available for publication.

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, 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 produces 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 during the war. 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 signal lenses. 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 ranged from $4.75 to $6.00 per pound during 1954.

TABLE 48. Production[1] of Selenium, 1945-1954

Year	Pounds	$	Year	Pounds	$
1945	379,187	728,039	1950	261,973	633,975
1946	521,867	949,798	1951	382,603	1,239,633
1947	501,090	937,038	1952	242,030	786,599
1948	390,894	781,788	1953	262,346	1,101,854
1949	318,225	652,361	1954	323,529	1,617,645

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

TABLE 49. Refinery Output of Selenium From Primary and Scrap Materials, 1931-1954

Year	Pounds	Year	Pounds	Year	Pounds
1931	21,500	1939	158,333	1947	496,765
1932	–	1940	198,057	1948	378,316
1933	48,221	1941	423,070	1949	288,166
1934	104,924	1942	527,374	1950	289,714
1935	366,425	1943	374,013	1951	371,060
1936	351,133	1944	300,519	1952	254,478
1937	401,497	1945	416,716	1953	307,903
1938	335,370	1946	497,070	1954	297,479

Tantalum-Columbium

During the year the tantalum and columbium concentrates from the Northwest Territories were treated at the Cap-de-la-Madeleine refinery of Boreul Rare Metals Limited. The refinery produced tantalum pentoxide and columbium pentoxide which was exported for further treatment. Mining development was continued in the North Bay area in Ontario and the Oka district in Quebec.

The market for tantalite-columbite concentrates is in the United States and the prices are largely governed by the stockpiling program. Through the year 1954 the E. & M. Journal Metal & Mineral Markets quoted "Columbium-tantalum Ore—Special DMPA domestic purchase price delivered f.o.b. depots in North Carolina, New Hampshire and South Dakota, minimum $Cb_2O_5 - Ta_2O_5$ in any ratio, per lb. acceptable material $1.70 plus 100% bonus, equivalent to $3.40 per lb. of combined contained pentoxide in 50% ore".

TABLE 50. World Production of Tantalite Concentrates, 1949-1953

(Taken from "Minerals Yearbook" published by the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
			pounds		
Australia	3,502	16,536	5,125	16,108	18,124
Brazil	91,237[2]	18,700[2]	8,818[2]	49,813[3]	39,532[3]
French Guiana[4]	—	—	—	—	13,228
Nigeria	4,980	2,240	6,720	2,240	—
Southern Rhodesia[4]	10,840	1,700	—	10,360	34,000
South West Africa	5,364	12,570	3,974	4,400	17,634
Spain[5]	—	—	—	741	—
Sweden[5]	—	—	—	—	4,242
Union of South Africa	—	4,000	6,000	8,000	38,000
United States (shipments)	1,020[4]	1,000[4]	925[4]	6	6
Total (estimate)	**123,000**	**62,500**	**37,500**	**95,000**	**165,000**

1. See columbite world production, Table 48, footnote 1. Tantalite production of Belgian Congo is included in columbite production figure.
2. Exports.
3. United States imports.
4. Tantalite--columbite.
5. Principally microlite.
6. Small quantity of tantalite is included in the columbite concentrates.

TABLE 51. World Production of Columbite Concentrates, 1949-1953

(Taken from "Minerals Yearbook" published by the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
			pounds		
Argentina[2]	1,080[4]	3	3	3	3
Belgian Congo[5]	255,780	297,675	209,437	231,042	623,902
Bolivia (exports)	—	—	1,043	—	3,366
Brazil	33,942[4]	26,709[4]	11,000[4]	5,017[6]	41,005[6]
British Guiana[6]	—	—	—	800	2,324
French Equatorial Africa	12,984	3,655	—	3,527	3,514
India	3	3	3	3	3
Madagascar	—	—	8,598	5,732	8,377
Malaya, Federation of	—	17,920[7]	56,000	105,280	116,480
Mozambique	550	7,700	11,257	32,652	58,123[8]

TABLE 51. World Production of Columbite Concentrates, 1949-1953 — Concluded

(Taken from "Minerals Yearbook" published by the United States Bureau of Mines)

Country[1]	1949	1950	1951	1952	1953
			pounds		
Nigeria	1,989,120	1,935,360	2,419,200	2,896,320	4,388,160
Norway[6]	—	—	—	—	26,233
Portugal (exports)	—	3,009	4,526	—	213,846
Spain[6]	—	—	—	—	4,410
Sweden[6]	—	—	—	—	30,847
Uganda[9]	5,571[4]	11,413[4]	42,560[4]	9,094[4]	23,542[4]
United States (shipments)	10	10	10	5,385[11]	14,867[12]
Total (estimate)	**2,500,000**	**2,450,000**	**2,850,000**	**3,400,000**	**5,550,000**

1. Concentrates produced in Argentina, Belgian Congo, French Equatorial Africa, Mozambique and Portugal are frequently termed "columbite — tantalite", this designation being applied because, in general, their composition ($Cb_2O_5 + Ta_2O_5$) lies in an intermediate range, neither Cb_2O_5 nor Ta_2O_5 being strongly predominant. In tabulating production of columbite and tantalite, all output designated "columbite—tantalite" has arbitrarily been placed in the columbite table.
2. Estimated average Cb_2O_5 content of concentrates.
3. Data not available; estimate included in total.
4. Exports.
5. In addition, tin—columbite—tantalite concentrates were produced as follows; 1949, 1,944,457 pounds; 1950, 2,431,674 pounds; 1951, 2,597,019 pounds; 1952, 2,813,070 pounds; columbite—tantalite content averaging about 10 percent.
6. United States imports.
7. Estimate.
8. In addition to figure shown, 176 pounds of samarskite were produced in 1951 and 132 pounds in 1953.
9. Columbite — tantalite concentrates.
10. Columbite and tantalite production in the United States not always differentiated; therefore see tantalite table.
11. Small quantity of tantalite is included in the columbite concentrates.
12. Small quantity of tantalite and microlite is included in the columbite concentrates.

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.

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, 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 $1.75 a pound in New York throughout 1954.

TABLE 52. Production[1] of Tellurium, 1945-1954

Year	Pounds	$	Year	Pounds	$
1945	484	929	1950	10,075	19,143
1946	15,848	24,405	1951	8,913	16,400
1947	9,194	16,090	1952	6,035	10,259
1948	11,425	19,994	1953	4,694	8,215
1949	11,692	21,046	1954	8,171	14,300

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

TABLE 53. Consumption of Tellurium Metal in Steel and White Metal Foundries, 1944-1953

Year	Steel foundries	White metal foundries	Year	Steel foundries	White metal foundries
	Pounds			Pounds	
1944	398	531	1949	—	310
1945	—	308	1950	—	962
1946	—	1,372	1951	—	672
1947	—	974	1952	—	1,237
1948	—	947	1953	—	510

TABLE 54. Refinery Output of Tellurium, 1934-1954

Year	Pounds	Year	Pounds	Year	Pounds
1934	5,130	1941	11,453	1948	8,739
1935	16,425	1942	9,500	1949	8,726
1936	35,618	1943	8,600	1950	6,010
1937	40,913	1944	9,900	1951	6,301
1938	51,254	1945	...	1952	5,710
1939	3,554	1946	14,200	1953	17,295
1940	3,491	1947	6,169	1954	7,990

Thallium

There has been no production of thallium in Canada since 1944. The first commercial production of this element in this country was in 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 $12.50 per pound nominal, December, 1954.

Tin

No economic deposits of tin have been found in Canada up to the present. Minor occurrences, principally of cassiterite (SnO_2) the most important tin mineral, are found in the New Ross area, Lunenburg county, Nova Scotia; in the Sudbury mining division of Ontario; in the Lac du Bonnet district of southeastern Manitoba; in southern British Columbia; in the Mayo district, Yukon, and in the Yellowknife area, Northwest Territories. Those in Nova Scotia, Ontario, Manitoba and the Northwest Territories are found largely in pegmatite dykes. In Yukon crystalline cassiterite is found in placer gravels along numerous creeks and in one small lode deposit. 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 1954 the tin concentrates were exported for treatment.

The New York quotations showed the monthly average price for tin was: January $0.85, April $0.96, July $0.96, October $0.93, December $0.89, per pound.

TABLE 55. Production of Tin, 1945-1954

Year	Pounds	$	Year	Pounds	$
1945	849,983	492,990	1950	796,403	828,259
1946	874,186	507,028	1951	346,718	494,073
1947	714,198	517,794	1952	212,113	253,581
1948	691,332	688,567	1953	643,254[1]	581,746
1949	619,117	633,047	1954	333,788[1]	263,359

1. Tin content of concentrates.

TABLE 56. Production of New Tin, Domestic Consumption and Imports, 1945-1954

Year	Production	Domestic consumption	Imports	Stocks at end of period
	Tons of 2,000 pounds			
1945	425	4,108	3,597	2,565
1946	437	4,152	3,514	2,430
1947	357	4,063	2,601	3,152
1948	346	4,531	4,029	2,944
1949	310	4,835	4,117	939
1950	398	5,069	5,395	1
1951	173	5,299	6,872	1
1952	106	4,693	4,423	1
1953	322[2]	4,372	4,146	1
1954	167[2]	4,036	4,296	1

1. Not available.
2. Tin content of concentrates.

TABLE 57. Consumption of Tin (Ingots or Bars), by Principal Industries, 1949-1953

	1949	1950	1951	1952	1953
	Tons of 2,000 pounds				
In white metal foundries (solder, babbitt, etc.)	1,358	1,953	1,819	1,447	1,870
In steel plants (chiefly for tinplate)	2,853	2,439	3,000	2,819	2,054
In brass and bronze foundries	219	178	347	252	178
In other industries	405	499	133	175	270
Total	**4,835**	**5,069**	**5,299**	**4,693**	**4,372**

TABLE 58. World Mine Production of Tin (Content of Ore), by Countries, 1949-1953

(Taken from "Minerals Yearbook" published by the United States Bureau of Mines)

Country	1949	1950	1951	1952	1953
	Long tons[1]				
North America:					
Canada	276	356	155	95	293
Mexico	358	440	366	373	476
United States	68	94	88	99	75
Total North America	**702**	**890**	**609**	**567**	**844**
South America:					
Argentina	268	267	242	239[2]	158
Bolivia (exports)	34,115	31,213	33,132	31,959	34,825
Brazil	325	180	197	180[2]	180[2]
Peru[3]	51	38	86	31	—
Total South America	**34,759**	**31,698**	**33,657**	**32,409**	**35,163**
Europe:					
France	73	117	170[2]	354[2]	498
Germany, East[2]	120	120	298	420	563
Italy	—	—	—	—	—
Portugal[4]	785	690	902	1,028	1,520[2]
Spain	666	575[2]	716[2]	589	795
United Kingdom[5]	1,217	1,230[2]	1,210[2]	954	1,103
Total Europe[6]	**2,861**	**2,732**	**3,296**	**3,345**	**4,479**
Africa:					
Belgian Congo[7]	13,760	13,464	13,669	13,798	15,292
French Cameroon	73	67	72	86	87
French Morocco	—	—	13	14	9
French West Africa	26	51	65	110	118
Mozambique	1	1	8	3	[2]
Nigeria	8,824	8,258	8,529	8,318	8,215
Northern Rhodesia	7	4	2	11	[2]
Southern Rhodesia	70	65	40	30	30
South West Africa	120	100	76	86	210
Swaziland	32	37	32	36	36
Tanganyika (exports)	109	97	67	47	47
Uganda (exports)	128	192	118	82	90
Union of South Africa	471	643	746	935	1,360
Total Africa	**23,621**	**22,979**	**23,437**	**23,556**	**25,500**
Asia:					
Burma	1,781	1,520	1,624	1,103	960[2]
China[2]	4,300	7,500	7,500	8,600	6,300
Indochina	40	62	92	156	264
Indonesia	28,965	32,102	30,986	35,003	33,822
Japan	190	326	426	639	736[2]
Malaya	54,910	57,537	57,167	56,838	56,254
Thailand	7,815	10,364	9,502	9,473	10,126
Total Asia	**98,001**	**109,411**	**107,297**	**111,812**	**108,462**
Australia	1,882	1,855	1,577	1,556	1,553
Total (estimate)[6]	**161,800**	**169,600**	**169,900**	**173,200**	**176,000**

1. This table incorporates a number of revisions of data published in previous tin chapters.
2. Estimated by authors of the chapter to appear in Minerals Yearbook, and in a few instances, from the Statistical Bulletin of the International Tin Study Group, The Hague.
3. Minor constituent of other base metal ores.
4. Excluding mixed concentrates.
5. Intake by smelters.
6. Excluding production of U.S.S.R.
7. Including Ruanda-Urundi.

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 were 303,348 tons of ore received at the smelter. About 232,752 tons were treated to yield about 90,500 tons of iron (remelt) and steel ingots, and over 122,900 tons of slag. The slag, having a titanium dioxide content of about 71 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. Research work on titanium was carried on by Shawinigan Water and Power Company Limited, Quebec Metallurgical Industries Limited, Thompson Products Limited and Atlas Steels Limited.

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. Ferro-titanium 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 1954 were: Ilmenite, 56 to 60% TiO_2, $18 to $20 per gross ton; rutile, 94% TiO_2, 7 to 7½ cents per pound. The nominal quotation for titanium metal, 99.3 per cent, was $4.50 per pound.

TABLE 59. Producers' Shipments of Titanium Ore[1] to Foreign Smelters, 1945-1954

Year	Short tons	$	Year	Short tons	$
1945	14,147	67,575	1950	1,253	7,706
1946	1,406	7,735	1951	1,674	9,790
1947	7,104	38,036	1952	51	459
1948	4,441	21,091	1953	9,292	80,085
1949	540	2,892	1954	1,541	9,462

1. All from Quebec.

TABLE 60. Imports of "Antimony Oxide, Titanium Oxide and White Pigments Containing Not Less Than 14 Per Cent by Weight of Titanium", 1945-1954

Year	From the United Kingdom		From the United States		Total imports	
	Pounds	$	Pounds	$	Pounds	$
1945	79,440	16,752	21,279,636	2,029,137	21,359,076	2,045,889
1946	76,800	11,678	23,854,188	2,182,007	23,930,988	2,193,685
1947	17,920	4,862	27,294,577	2,960,964	27,312,497	2,965,826
1948	121,968	25,057	39,119,325	4,572,006	39,292,704	4,610,340
1949	1,436,162	254,809	40,150,356	4,902,730	41,586,518	5,157,539
1950	6,275,776	935,706	47,974,645	6,117,925	54,250,421	7,053,631
1951[1]	7,192,312	1,623,779	52,103,681	6,838,500	59,295,993	8,462,279
1952[1]	5,471,764	1,090,786	42,938,755	5,365,582	48,410,519	6,456,368
1953[1]	15,860,430	2,819,931	47,939,283	5,646,914	63,799,713	8,466,845
1954[1]	18,784,144	3,381,482	45,428,077	5,747,907	64,212,221	9,129,389

1. Excludes antimony oxide.

TABLE 61. Consumption of Titanium Oxide, by Industries, 1952 and 1953

Industry	1952		1953	
	Pounds	Cost at works	Pounds	Cost at works
		$		$
Paints:				
Extended titanium dioxide pigments	25,546,557	2,388,204	25,814,234	2,421,222
Titanium dioxide	15,756,185	3,841,422	21,190,312	4,764,592
Polishes and dressings	206,005	43,443	226,624	47,826
Pulp and paper	1,742,000	402,580	2,322,000	485,249
Linoleum and oilcloth	3,850,195	504,336	3,539,934	495,220
Rubber goods	1,068,782	249,838	1,067,355	244,107
Miscellaneous non-metallic minerals	488,646	122,162	774,658	142,947
Total accounted for	**48,667,370**	**7,551,985**	**54,935,117**	**8,601,163**

TABLE 62. World Production of Titanium Concentrates (Ilmenite and Rutile), by Countries[1], 1950-1954

(Taken from the "Minerals Yearbook" published by the United States Bureau of Mines)

Country	1950	1951	1952	1953	1954
	Short tons				
Ilmenite					
Australia[2]	13,690	13,330	8,000	8,700	3
Brazil	—	—	—	—	—
Canada	3,502[4]	21,203[4]	42,192[4]	146,614[4]	124,162[4]
Egypt	287	359	2,202	843	248
India	238,183	250,975	251,883	240,946	186,612[5]
Japan[6]	—	—	—	2,028	2,627
Malaya[5]	27,905	48,712	24,302	29,758	50,114
Norway	115,908	116,139	130,370	141,220	164,448
Portugal	73	186	476	746	543
Senegal	869	4,311	5,095	3,858	13,779
Spain	702	772	1,410	1,582	1,269
United States[7]	468,320	535,835	528,588	513,696	547,711
Total ilmenite	**869,400**	**991,800**	**994,500**	**1,090,000**	**1,097,000**
Rutile					
Australia	19,825	39,170	41,800	42,604	50,018
Brazil[5]	9	—	19	—	—
French Cameroon	28	119	324	58	179[5]
French Equatorial Africa	7	—	—	—	—
India	9	9	9	117	3
Norway	9	9	47	3	3
Senegal	—	9	9	—	—
United States	10	10	10	6,825	7,411
Total rutile	**27,900**	**46,300**	**50,700**	**49,600**	**57,800**

1. This table incorporates a number of revisions of data published in previous titanium chapters.
2. Estimated ilmenite content of all ilmenite-bearing concentrates.
3. Data not available; estimate included in totals.
4. Includes titanium slag containing approximately 70 per cent TiO_2.
5. Exports.
6. Represents titanium slag.
7. Includes a mixed product containing altered ilmenite, leucoxine and rutile.
8. Estimated rutile content of all rutile-bearing concentrates.
9. Figure withheld in order to avoid disclosure of U.S. production by differences: see footnote 10.
10. Figure withheld in order to avoid disclosure of individual company operation.

TABLE 63. Consumption of Ferrotitanium in the Manufacture of Steel, 1944-1953

Year	Tons	$	Year	Tons	$
1944	786	149,527	1949	142	29,067
1945	656	123,975	1950	143	30,664
1946	416	73,485	1951	164	50,641
1947	500	86,228	1952	229	97,327
1948	442	81,129	1953	213	50,433

Tungsten

During 1954 all of the tungsten output came from mines in British Columbia. Some scheelite was produced from the gold mines in Northern Ontario in the preceding year. The Yukon Territory contributed a small tonnage of tungsten concentrates in earlier years.

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.

In United States a price was established at $63 per short ton unit of WO_3 to mines in United States. Prices to foreign countries, at U.S. ports, duty extra, were wolfram $25 to $26; scheelite $27 to $28 per short ton unit.

TABLE 64. Production (Commercial Shipments) of Tungsten Concentrate, 1945-1954

Year	Concentrate	Wo_3 content	Value
	Pounds		$
1945	1,153	792	1,045
1946	—	—	—
1947	668,000	496,023	680,792
1948	1,409,297	1,046,160	1,046,160
1949	334,000	252,380	252,380
1950	1,886,000[1]	284,078	160,343
1951	4,145	2,833	7,098
1952	3,670,686	1,434,641	4,307,879
1953	6,307,717	2,446,028	5,689,160
1954	3,237,748	2,170,633	5,795,781

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

TABLE 65. Consumption of Ferrotungsten in Steel Furnaces, 1944-1953

Year	Short tons	Cost at works	Year	Short tons	Cost at works
		$			$
1944	86	287,116	1949	190	428,535
1945	138	455,317	1950	117	302,872
1946	260	402,174	1951	364	2,726,887
1947	366	888,904	1952	212	1,609,590
1948	187	590,584	1953	49	275,761

TABLE 66. World Production of Tungsten Ores, by Countries[1], of Concentrates containing 60 per WO_3 – 1949-1953

(Taken from the "Minerals Yearbook" published by the United States Bureau of Mines)

Country	1949	1950	1951	1952	1953
	Metric tons				
North America:					
Canada	191	215	2	1,128	1,803
Mexico	65	67	325	443	682
United States (shipments)	2,508	4,373	5,693	6,905	8,713
Total North America	**2,764**	**4,655**	**6,020**	**8,476**	**11,198**
South America:					
Argentina	30[2]	20[2]	100	600	600
Bolivia (exports)	2,543	2,485	2,718	3,707	3,825
Brazil (exports)	575	759	1,422	1,784	1,947
Peru	455	516	469	584	733
Total South America	**3,600[2]**	**3,780[2]**	**4,709**	**6,675**	**7,105**
Europe:					
Finland	49	20	8	47	22
France	792	456	765	946	1,000[2]
Italy	3	2	5	5	5
Portugal	2,700	2,500	5,148	5,283	5,070
Spain	888	850	2,553	5,479	2,950
Sweden	468	362	383	337	350[2]
U.S.S.R.[2]	6,000	7,500	7,500	7,500	7,500
United Kingdom	81	76	61	55	61
Yugoslavia	–	–	–	–	120
Total Europe (estimate)	**11,000**	**11,800**	**16,400**	**19,700**	**17,000[2]**
Asia:					
Burma	740	930	1,647	2,200	2,000
China	9,000[2]	12,000[2]	15,800[2]	20,000[2]	20,000[2]
Hong Kong	–	–	23	104	160
India	–	2	15	10	10[2]
Japan	20	24	166	482	743
Korea; Republic of	1,448	2,000	1,269	3,500	6,800
North Korea	1,000	1,000[2]	1,200[2]	1,200[2]	1,500[2]
Malaya, Federation of	69	27	54	79	147
Thailand	1,100[2]	1,200[2]	1,350[2]	1,600[2]	1,890
Total Asia (estimate)	**13,400**	**17,000**	**21,500**	**29,000**	**33,200**
Africa:					
Algeria	–	–	22	49	30
Belgian Congo[3]	355	400	653	1,010	1,273
Egypt	–	–	7	21	14
French Morocco	–	7	38	18	12
Nigeria	5	5	23	23	18
Southern Rhodesia	26	64	231	420	380
South West Africa	6	4	33	118	150
Tanganyika (exports)	42	15	15	14	12
Uganda (exports)	180	218	167	151	179
Union of South Africa	416	96	188	263	386
Total Africa	**1,030**	**809**	**1,377**	**2,087**	**2,454**
Oceania:					
Australia	1,371	1,235	1,883	2,171	2,300
New Zealand	28	24	35	63	40[2]
Total Oceania	**1,399**	**1,259**	**1,918**	**2,234**	**2,340[2]**
Grand total (estimate)	**33,200**	**39,300**	**52,000**	**68,000**	**73,000**

1. This table incorporates a number of revisions of data published in previous Minerals Yearbook tungsten chapters.
2. Estimate.
3. Including Ruanda-Urandi.

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, 1954, at 31 cents per pound contained V_2O_5, f.o.b. shipping point, by "E & M.J. Metal and Mineral Markets", New York.

TABLE 67. World Production of Vanadium in Ores and Concentrates

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

Country	1950	1951	1952	1953	1954
	Short tons				
North America:					
United States, (shipments)[1]	2,298	3,088	3,600	4,643	4,930
South America:					
Argentina	8[2]	8[2]	8[2]	8[2]	8[2]
Peru	481	495	482	349	195
Total	**489**	**503**	**490**	**357**	**203**
Africa:					
Rhodesia, Nyassaland, Northern Rhodesia	—	96	47	—	—
South West Africa	325	583	688	596	633
Total	**325**	**679**	**735**	**596**	**633**
World total (estimate)[3]	**3,112**	**4,270**	**4,825**	**5,596**	**5,766**

1. Includes vanadium recovered as a by-product of phosphate-rock mining.
2. Estimate.
3. Total represents data only for countries shown in table and excludes vanadium in ores produced in French Morocco, 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.

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, 1954, were: zircon ore, 65 per cent ZrO_2, $48 to $49 per long ton, at Atlantic seaboard; zirconium powder, $7. per pound.

TABLE 68. World Production of Zirconium Ores and Concentrates, by Countries

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

Country	1950	1951	1952	1953	1954
	Short tons				
Australia[1]	24,120	47,006	32,893	31,655	44,143
Brazil[2]	3,325	3,854	4,378	1,406[3]	1,408[4]
Egypt	105	4	133	263	109
French West Africa	243	32	5	1,047	1,012
India	5	5	5	5	5
United States	5	5	5	5	5

1. Estimated zircon content of all zircon-bearing concentrates.
2. Chiefly baddeleyite.
3. Exports.
4. Imports into United States.
T. Not available for publication.

Directory of Firms in the Miscellaneous Metal Mining Industry, 1934

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
Antimony:		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Antimony Gold Mining & Smelting Co. Ltd.[1]	67 Yonge St., Toronto, Ontario	West Gore, Nova Scotia
Lake George Antimony Syndicate[1]	Box 672, Frederiction, New Brunswick	Lake George
Barium:		
Dominion Magnesium Ltd.	Haley, Ontario	Haley, Ontario
Beryl:		
Canadian Beryllium Mines & Alloys Ltd.[2]	100 Adelaide St. W., Toronto, Ontario	Renfrew County, Ontario
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
Cadmium:		
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
Britannia Mining & Smelting Co. Ltd.	Britannia Beach, British Columbia	Britannia Beach, British Columbia
Canadian Exploration Ltd.	Royal Bank Bldg., Vancouver, British Columbia	Salmo, British Columbia
Caledonia Mine, c/o G.E. McCready	Kaslo	Ainsworth
Carnegie Mines of British Columbia Ltd.	1126 Sherbrooke St. W., Montreal, Quebec	Slocan, British Columbia
Cody Reco Mines Ltd.	11 King St. W., Toronto, Ontario	Slocan, British Columbia
Cuprus Mines Ltd.	500 Royal Bank Bldg., Winnipeg, Manitoba	Flin Flon, Manitoba
Giant Mascot Mines Ltd.	908 Royal Bank Bldg., Vancouver, British Columbia	Spillimachen
Mackeno Mines Ltd.	100 Adelaide St. W., Toronto, Ontario	Mayo
Sheep Creek Gold Mines Ltd.	413 Granville St., Vancouver, British Columbia	Zincton, British Columbia
Silver Standard Mines Ltd.	602 W. Hastings St., Vancouver, British Columbia	Hazelton, British Columbia
Sil-Van Consolidated Mining & Milling Ltd.	213–602 W. Hastings St., Vancouver 2, British Columbia	Smithers, British Columbia
Sunshine Lardeau	717–744 W. Hastings St., Vancouver, British Columbia	Beaton, British Columbia
Tulsequah Mines Ltd.	Trail, British Columbia	Tulsequah, British Columbia
Violamac Mines (B.C.) Ltd.	New Denver, British Columbia	New Denver, British Columbia
Western Exploration Co. Ltd.	Silverton, British Columbia	Silverton, British Columbia
United Keno Hill Mines Ltd.	85 Richmond St. W., Toronto, Ontario	Elsa, Yukon
Chromite:		
Colonial Chrome Co. Ltd.[2]	420 Lexington Ave., New York, N.Y., U.S.A.	Black Lake, Quebec
Gunnar Gold Mines Ltd.[2]	80 King St., Toronto, Ontario	Bird River, Manitoba
Iron Ore:		
Dominion Wabana Ore Ltd.	Wabana, Newfoundland	Bell Island, Newfoundland
Hollinger North Shore Exploration Co. Ltd.[1]	721 Royal Bank Building, Montreal, Quebec	New Quebec
Iron Ore Company of Canada	810 Cote de Liesse Road, Montreal, Quebec	New Quebec, Labrador
Labrador Mining & Exploration Co. Ltd.[1]	360 St. James St. West, Montreal, Quebec	Labrador
Canadian Cliffs Ltd.[1]	Port Artur, Ontario	Temiscamie River
Canadian Javelin Ltd.[1]	1010 Ste. Catherine St. W., Montreal, Quebec	Wabush Lake
Consolidated Fenimore Iron Mines Ltd.[1]	56 King St. W., Toronto, Ontario	Ungava.
Gravimetric Surveys Ltd.[1]	53 Queen St., Ottawa, Ontario	Swan Lake
Hollannah Mines Ltd.[1]	360 St. James St. W., Montreal, Quebec	New Quebec
Jones, R.H.B.[1]	612 Wolvin Bldg., Duluth, Minn., U.S.A.	Saguenay, Quebec
Moore, Warren S.[1]	400 Torrey Bldg., Duluth, Minn., U.S.A.	Matonipi Lake, Quebec
O'Brien, M.J., Ltd.[1]	140 Wellington St., Ottawa, Ontario	Mistassini
Oceanic Iron Ore of Canada Ltd.[1]	44 King St. W., Toronto, Ontario	Labrador
Rawdon Iron and Titanium Inc.	12 Ste. Marie St., Marieville, Quebec	Rawdon Twp.
Trent River Iron Ltd.[1]	54 Rideau St., Ottawa, Ontario	Bristol Twp., Quebec
Algoma Ore Properties Ltd.	Cornwall Building, Sault Ste. Marie, Ontario	Algoma district, Ontario
Hamoos Lake Mines Ltd.[1]	20 Temperance St., Toronto, Ontario	Port Arthur
Bethlehem Mines Corporation	701 East Third St., Bethlehem, Pa., U.S.A.	Marmora, Ontario
Culand Ore Company[1]	38 S. Deaborn St., Chicago, U.S.A.	Rainy River, Ontario
Carat Mining Co. Ltd.[1]	7 King St. W., Toronto, Ontario	Thunder Bay
Head of the Lakes Iron Ltd.[1]	85 Richmond St. W., Toronto, Ontario	Quetico Park, Ontario
Iron Bay Mines Ltd.	Haileybury, Ontario	Bruce Lake
Jalore Mining Co. Ltd.[1]	68 Yonge St., Toronto, Ontario	Michipicoten, Ontario
Mag-Iron Mining & Milling Co. Ltd.	49 Wellington St. E., Toronto, Ontario	Hastings Co., Ontario
Steep Rock Iron Mines Ltd.	25 King St. W., Toronto, Ontario	Rainy River District, Ontario
The Argonaut Co. Ltd.	Box 1000, Campbell River, British Columbia	Comox, British Columbia
Anyox Metals Ltd.[1]	25 King St. W., Toronto, Ontario	Zeballos, British Columbia
Sulgas Properties Ltd.[1]	714 W. Hastings St., Vancouver, British Columbia	Skeena, British Columbia
Texada Mines Ltd.	Box 35, Vananda, British Columbia	Texada Island, British Columbia
Belcher Mining Corp. Ltd.[1]	80 King St. W., Toronto, Ontario	Belcher Islands, N.W.T.
Indium:		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Manganese:		
Quebec Manganese Mines Ltd.[2]	231 St. James St. W., Montreal, Quebec	Magdalen Islands, Quebec

Directory of Firms in the Miscellaneous Metal Mining Industry, 1954 – Continued

Name of firm and product	Head office address	Location of mine or plant
Magnesium:		
Dominion Magnesium Ltd.	67 Yonge St., Toronto, Ontario	Haley, Ontario
Aluminum Co. of Canada Ltd.	1700 Sun Life Building, Montreal, Quebec	Arvida, Quebec
Mercury:		
Bralorne Mines Ltd.[2]	555 Burrard St., Vancouver, British Columbia	Omineca district, British Columbia
Consolidated Mining & Smelting Company of Canada Ltd.[2]	215 St. James St., Montreal, Quebec	Pinchi Lake, British Columbia
Molybdenite:		
Acme Molybdenite Mining Co. Ltd.[1]	402 Bank of Canada Bldg., Montreal, Quebec	Maniwaki, Quebec
Belpat Molybdenum Mines Ltd.[1]	263 Ste. Catherine St. E., Montreal, Quebec	La Pause Twp., Quebec
Berens River Mines Ltd.[1]	25 King St. W., Toronto, Ontario	La Pause Lake
Molybdenite Corp. of Canada Ltd.	31 ouest St. Jacques, Montreal, Quebec	La Corne, Quebec
Portneuf Mineral Corp. Ltd.[1]	437 St. James St. W., Montreal, Quebec	Portneuf Co., Quebec
Quebec Metallurgical Industries Ltd.[1]	88 Metcalfe St., Ottawa, Ontario	Clarendon Twp., Quebec
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:		
Tantalum Refining & Mining Corporation of America[1]	11 King St. W., Toronto, Ontario	Ross Lake, Northwest Territories
Boreal Rare Metals Ltd.	1610 Sherbrooke St., Montreal, Quebec	Hearn Channel, Yellowknife
Oka Rare Metals Mining Co. Ltd.	112 Yonge St., Toronto, Ontario	Oka, Quebec
Quebec Tantalum & Lithium Mining Co. Ltd.	44 King St. W., Toronto, Ontario	Figuery Twp., Quebec
Thallium:		
Hudson Bay Mining & Smelting Co. Ltd.[1]	500 Royal Bank Building, Winnipeg, Manitoba	Flin Flon, Manitoba
Tin:		
Consolidated Mining & Smelting Company of Canada Ltd.	215 St. James St., Montreal, Quebec	Trail, British Columbia
Mountain Crest Mines Ltd.[2]	1445 MacKay St., Montreal, Quebec	Charlevoix, Quebec
Titanium Ore:		
American Titanic Iron Ore Co.	Baie St. Paul, Quebec	St. Urbain, Quebec
Baie St. Paul Titanic Iron Ore Co.	Baie St. Paul, Quebec	St. Urbain, Quebec
Bersimis Mining Co.[1]	10-16 Blvd. Des Capucins, Quebec	Saguenay Co., Quebec
Du Trempco Inc.[1]	12 Ste-Marie, Marieville, Quebec	Rawdon, Chersey, Quebec
Hoyd, Louis[1]	136 Park Ave., Yonkers, N.Y., U.S.A.	Portneuf River, Quebec
Laurentian Titanium Mines Ltd.[1]	4462 St. Denis St., Montreal, Quebec	Wexford & Chertsey Twps., Quebec
Pershing Amalgamated Mines Ltd.[1]	1410 Stanley St., Montreal, Quebec	Terrebonne Co., Quebec
Quebec Iron and Titanium Corp.	1510 Drummond St., Montreal, Quebec	Lac Tio, Quebec
St. Lawrence Iron & Titanium Mines Ltd.[1]	1200 St. Alexander St., Montreal, Quebec	St. Urbain, Quebec
Titanium Development Corporation[1]	1410 Stanley St., Montreal, Quebec	Berresford Twp., Quebec
Zemke Mining Co. Ltd.[1]	1596 Pine Ave. N., Montreal, Quebec	St. Urbain, Quebec
Tungsten Concentrates:		
Burnt Hill Tungsten Mines Ltd.	510 McGill St., Montreal, Quebec	Cross Creek, New Brunswick
Lake Thomas Syndicate Ltd.	412 Roy Bldg., Halifax, Nova Scotia	Lake Thomas, Nova Scotia
Hollinger Consolidated Gold Mines Ltd.[1]	Timmins, Ontario	Timmins, Ontario
Akokli Tungsten Mine Ltd.[1]	609 Baker St., Nelson, British Columbia	Nelson, British Columbia
Canadian Exploration Ltd.	Royal Bank Building, Vancouver, British Columbia	Salmo, British Columbia
Columbia Lead & Zinc Mines Ltd.	615 Credit-Foncier Bldg., Vancouver, British Columbia	Albert Canyon, British Columbia
Gunnar Lundborg	Bralorne	Lillooet, British Columbia
Western Tungsten Copper Mines Ltd.	505 Dunsmir St., Vancouver, British Columbia	Skeena Crossing, British Columbia
Tungsten Corporation of Canada[1]	43 King St. W., Toronto, Ontario	Outpost Island, Northwest Territories
Taylor, Fred	Mayo, Yukon	Dublin Gulch, Yukon
Uranium:		
Quebec:		
Bauscadillac Gold Mines Ltd.	85 Richmond St. W., Toronto, Ontario	Oka
Calumet Contact Uranium Mines Ltd.	159 Craig St. W., Montreal	Ile Calumet
Calumet Uranium Mines Ltd.	159 Craig St. W., Montreal	Pontiac Co.
Can-Que Uranium Mines Ltd.	132 St. James St. W., Montreal	Lytton Twp.
Consolidated Halliwell Ltd.	80 King St. W., Toronto, Ontario	Huddersfield
Coulee Lead & Zinc Mines Ltd.	67 Yonge St., Toronto, Ontario	Oka, Quebec
Duvex Oils & Mines Ltd.	100 Adelaide St. W., Toronto, Ontario	Lytton Twp.
Gatineau Uranium Mines Ltd.	100 Adelaide St. W., Toronto, Ontario	Baskatong Twp.
Headway Red Lake Gold Mines Ltd.	67 Yonge St., Toronto, Ontario	Oka
Huddersfield Uranium & Minerals Ltd.	159 Craig St. W., Montreal	Otter Lake
Langley Bay Uranium Mines Ltd.	85 Richmond St. W., Toronto, Ontario	Oka
Maniwaki Kid Uranium Mining Corp.	1551 Bishop St., Montreal	Egan Twp.
Marlowe Mines Ltd.	1557 Mackay St., Montreal	Lac Tonnere
Molybdenum Corp. of America	500 Fifth Ave., New York	Oka
Opawica Explorers Ltd.	455 Craig St. W., Montreal	Kinsington Twp.
St. Simeon Uranium Corp.	1200 St. Alexander St., Montreal	Charlevoix
Saguenay Mining & Smelting Co. Ltd.	1557 Mackay St., Montreal	Pied des Monts
Sapphire Petroleums Ltd.	15½ King St. E., Toronto, Ontario	Oka
Severin Auf der Maur, J.	1557 Mackay St., Montreal	Lacoste Twp.
Sunbury Mines Ltd.	88 Emond St., Hull	Gracefield
Titanic Mine Holdings Ltd.	215 St. James St. W., Montreal	Oka
Wakefield Uranium Mines Ltd.	1010 Ste. Catherine St. E., Montreal	Aldfield Twp.
Yates Uranium Mines Inc.	132 St. James St. W., Montreal	Huddersfield Twp.

Directory of Firms in the Miscellaneous Metal Mining Industry, 1954 – Concluded

Name of firm and product	Head office address	Location of mine or plant
Uranium – Concluded:		
Ontario:		
Aquarius Porcupine Gold Mines Ltd.	44 King St. W., Toronto	Algoma Mills
Armistice Gold Mines Ltd.	44 King St. W., Toronto	Algoma Mills
Aumacho River Mines Ltd.	25 Adelaide St. W., Toronto	Cardiff Twp.
Beaucage Mines Ltd.	170 Regina St., North Bay	Lake Nipissing
Blind River Uranium Mines Ltd.	85 Richmond St. W., Toronto	Sugar Lake
Burnt River Uranium Mines Ltd.	26 Queen St. E., Toronto	Wilberforce
Buckles Algoma Uranium Mines Ltd.	44 King St. W., Toronto	Algoma Mills
Canagau Mines Ltd.	372 Bay St., Toronto	Sault Ste. Marie
Cardiff Uranium Mines Ltd.	26 Queen St. E., Toronto	Wiberforce
Centre Lake Uranium Mines Ltd.	25 King St. W., Toronto	Bancroft
Chyka Mines Ltd.	25 Adelaide St. W., Toronto	Lacknar Twp.
Conecho Mines Ltd.	44 King St. W., Toronto	Algoma
Consolidated Denison Mines Ltd.	King & Yonge Sts., Toronto	Quirke Lake
Cordell Gold Mines Ltd.	347 Bay St., Toronto	Cardiff Twp.
Croft Uranium Mines Ltd.	85 Richmond St. W., Toronto	Bancroft
Fab Metal Mines Ltd.	25 Adelaide St. W., Toronto	Cardiff Twp.
Faraday Uranium Mines Ltd.	100 Adelaide St. W., Toronto	Faraday
Farcroft Mines Ltd.	100 Adelaide St. W., Toronto	Bancroft
Geneva Lake Mines Ltd.	357 Bay St., Toronto	Blind River
Goldhawk Porcupine Mines Ltd.	320 Bay St., Toronto	Faraday Twp.
Homer Yellowknife Mines Ltd.	184 Bay St., Toronto	Wilberforce
Peach Uranium & Metal Mining Ltd.	44 King St. W., Toronto	Algoma
Pickering Metal Mines Ltd.	7 King St. W., Toronto	Mack Twp.
Pitchgoma Mines Ltd.	44 King St. W., Toronto	Sault Ste. Marie
Plum Uranium & Metal Mining Ltd.	44 King St. W., Toronto	Lewis Twp.
Plympton Uranium & Metal Mines Ltd.	44 King St. W., Toronto	Algoma Mills
Pronto Uranium Mines Ltd.	44 King St. W., Toronto	Long Twp.
Lake Nordic Uranium Mines Ltd.	44 King St. W., Toronto	Lake Nordic
McMarmac Red Lake Gold Mines Ltd.	405 Glencairn Ave., Toronto	Blind River
North Lake Mines Ltd.	100 Adelaide St. W., Toronto	Cardiff
Moon Lake Uranium Mines Ltd.	44 King St. W., Toronto	Algoma
Rare Earth Mining Corp. Ltd.	810 Sterling Tower, Toronto	Monmouth Twp.
Roford Mines Ltd.	916 Erie St., Windsor	Monmouth Twp.
Shakespeare Uranium Ltd.	67 Yonge St., Toronto	Lake Agnew
Stanleigh Uranium Mining Corp. Ltd.	372 Bay St., Toronto	Algoma
Talvey Metal Mines Ltd.	604 Queen St. E., Sault Ste.Marie	Blind River
Taman Uranium Mines Ltd.	145 Yonge St., Toronto	Striker Twp.
Trio Uranium Mines Ltd.	137 Wellington St. W., Toronto	McDougall Twp.
Uranium King Corp. Inc.	1551 Bishop St., Montreal, Quebec	Elliot Lake
Whitney Uranium Mines Ltd.	1085 Beaver Hall Hill, Montreal, Quebec	Sault Ste. Marie
Zenmac Metal Mines Ltd.	200 Bay St., Toronto	Blind River
Saskatchewan:		
Anglo-Rouyn Mines Ltd.	44 King St. W., Toronto, Ontario	Athabaska
Athona Mines (1937) Ltd.	25 Adelaide St. W., Toronto, Ontario	Athabaska
Big Jackpot Mines Ltd.	Box 815, Kirkland Lake, Ontario	Uranium City
Bluegrass Uranium Mines Ltd.	8 Colborne St., Toronto, Ontario	Beaverlodge
Colder-Bousquet Gold Mines Ltd.	44 King St. W., Toronto, Ontario	Athabaska
Chimo Gold Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Beaverlodge
Clix Athabasca Uranium Mines Ltd.	44 King St. W., Toronto, Ontario	Athabaska
Consolidated Nicholson Mines Ltd.	532 Burrard St., Vancouver, British Columbia	Goldfields
Detta Minerals, Ltd.	145 Yonge St., Toronto, Ontario	Beaverlodge
Durocher Uranium Co. Ltd.	Selkirk Hotel, Edmonton, Alberta	Laird Island
Femco Mines Ltd.	184 Bay St., Toronto, Ontario	Athabaska
Goldfields Uranium Mines Ltd.	44 King St. W., Toronto, Ontario	Uranium City
Great West Uranium Mines Ltd.	105 Ross Bldg., Saskatoon	Uranium City
Gulch Mines Ltd.	217 Bay St., Toronto, Ontario	Beaverlodge
Gunnar Mine Ltd.	25 Adelaide St. W., Toronto, Ontario	Crackingstone Point
Lake Cinch Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Cinch Lake
Hawker Uranium Mines Ltd.	10076 Jasper Ave., Edmonton, Alberta	Athabaska
Imperial Mines & Metals Ltd.	10168-100th St., Edmonton, Alberta	Athabaska
Iso Uranium Mines Ltd.	100 Adelaide St. W., Toronto, Ontario	Athabaska
Jahala Lake Uranium Mines Ltd.	11 King St. W., Toronto, Ontario	Nunn Lake
Lisko Uranium Mines Ltd.	357 Bay St., Toronto, Ontario	Beaverlodge
La Ronge Uranium Mines Ltd.	11 King St. W., Toronto, Ontario	Nistowiak Lake
Meta Uranium Mines Ltd.	100 Adelaide St. W., Toronto, Ontario	Beaver Island
Nesbitt La Bine Uranium Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Uranium City
Nor'anium Minerals Ltd.	1845 Broad St., Regina	Beaverlodge
North Country Uranium & Minerals Ltd.	202 Welkin Bldg., Edmonton, Alberta	Athabaska
Nu-Age Uranium Mines Ltd.	184 Bay St., Toronto, Ontario	Athabaska
Pitchvein Mines Ltd.	82 Government Rd., Kirkland Lake, Ontario	Milliken Lake
Radiore Uranium Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Beaverlodge
Rix-Athabasca Uranium Mines Ltd.	44 King St. W., Toronto, Ontario	Uranium City
Sudbury Contact Mines Ltd.	100 Adelaide St. W., Toronto, Ontario	Beaverlodge
Trans-Dominion Mining & Oils Corp. Ltd.	1551 Bishop St., Montreal, Quebec	Rottenstone
Uranium Ridge Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Uranium City
British Columbia:		
Rexspar Uranium & Metals Mining Co. Ltd.	44 King St. W., Toronto, Ontario	Kamloops
St.Eugene Mining Corp. Ltd.	25 King St. W., Toronto, Ontario	Golden
Northwest Territories:		
Eldorado Mining & Refining Ltd.	Box 379, Ottawa, Ontario	Port Radium, N.W.T.; Eldorado, Saskatchewan; Port Hope, Ontario
Rayrock Mines Ltd.	25 Adelaide St. W., Toronto, Ontario	Marian River
Zirconium:		
Dominion Magnesium Ltd.	67 Yonge St., Toronto, Ontario	Bailey, Ontario

1. Active but not producing.
2. Holds dormant property.

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