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CANADA

DEPARTMENT OF TRADE AND COMMERCE

DOMINION BUREAU OF STATISTICS

CENSUS OF INDUSTRY

MINING, METALLURGICAL & CHEMICAL BRANCH

Report

on

MISCELLANEOUS METALS IN CANADA, 1936

including

Aluminium Antimony Barium Beryllium Bismuth Cadmium Calcium Chromium Iron Lithium Magnesium Manganese Mercury Molybdenum Radium - Uranium Selenium Sodium Tantalum Tellurium Tin Titanium (ilmenite) Tungsten Vanadium Zirconium





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DEPARTMENT OF TRADE AND COMMERCE DOMINION BUREAU OF STATISTICS MINING, METALLURGICAL AND CHEMICAL BRANCH OTTAWA - CANADA

Dominion Statistician: R. H. Coats, LL.D., F.R.S.C., F.S.S. (Hon.) Chief - Mining, Metallurgical and Chemical Branch: W. H. Losee, B.Sc. Mining Statistician: R. J. McDowall, B.Sc.

MISCELLANEOUS METALS, 1936.

Metal-bearing minerals, mined in relatively small quantities by a comparatively few operators, have been grouped by the Dominion Bureau of Statistics for consideration as a single industry. Included with the finally revised statistics relating to the Canadian production of these are notes and statistical data pertaining to various rare or semi-rare metals or metalliferous ores produced in other countries. Metals or metal-bearing ores produced in Canada during 1936 and classified as miscellaneous include bismuth, cadmium, chromite, manganese ore, radium and uranium products, selenium, tellurium and titanium ore. In addition to particulars relating to these metals or products, the bulletin contains notes of a summary nature on beryl and beryllium, lithium, magnesium, sodium, tungsten, calcium, aluminium, tin, iron ores, vanadium, mercury, molybdenite and zirconium.

It is to be noted that the majority 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 such statistics as relate 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 hon-ferrous smelting and refining industry.

ALUMINIUM

Primary aluminium is produced in Canada only by the Aluminum Company of Canada, Limited. This company operates reduction works at Arvida and Shawinigan Falls in the province of Quebec. No bauxite or aluminium ores are mined in Canada and concentrates for reduction purposes are prepared from imported crude ore in a special plant erected at Arvida. During 1936 the Arvida ore plant was in continuous operation for the production of bauxite concentrates, and aluminium ingot was produced from these at both Shawinigan Falls and Arvida. In addition to these primary operations, the metal is fabricated in several secondary plants in Canada, the output of which includes kitchenware, automobile parts and a variety of other manufactures.

According to the American Bureau of Metal Statistics, world production of aluminium in 1936 totalled 363,428 metric tons, an increase of 40.8 per cent above 1935. Canadian output during the year under review was recorded at 26,900 metric tons or 6,344 tons greater than in the preceding year. As a world producer of aluminium, Canada ranked fifth in 1936 being surpassed in the order of their output by the United States, Germany, Russia and France. Production of the metal in Japan has increased from 700 metric tons in 1934 to 5,000 metric tons in 1936, while that of Russia has increased from 855 metric tons in 1932 to 37,000 metric tons in 1936.

The average price of the metal in the United States in both 1935 and 1936 was 20.5 cents per pound as compared with an average price of 27.03 cents per pound in 1924 and the American Bureau of Metal Statistics remarks that these quotations, especially in recent years, are in excess of prices actually realized on large-scale business.

Imports of bauxite ore into Canada during 1936 totalled 342,834,800 pounds valued at \$2,663,184 while the total value of aluminium and its products exported from Canada during the same period amounted to \$11,498,482 compared with \$10,760,692 in 1935; of the 1936 exports those to the United Kingdom were valued at \$8,249,690 and those to the United States at \$560,708.

The United States Bureau of Mines reported that activity in the bauxite and aluminium industries of the United States returned to pre-depression levels in 1936; outside the United States, production and consumption of bauxite and aluminium in 1936 exceeded all previous records; activity in the foreign industry was due primarily to armament and nationalistic programmes, although recovery in general industrial activity and new uses also were important factors; construction of several new plants and additions to old plants were completed or begun during 1936.

Table	1	-	IMPORTS	INTO	CANADA	AND	EXPORTS	OF	ALUMINIUM,	ALUMINA	BAUXITE	AND	
					CRYOT	TTE.	1935 at	nd 7	936.				

URYOLITE,	1935 and 1	.930.5		the second s
	1 9	3 5	1 9 3	6
	Cwt.	\$	Cwt.	\$
IMPORTS -				
Alumina	1.645	16.457	1.547	17.006
Bauxite ore	2.546.136	2.883.330	3,428,348(a)	2.663.184
Cryolito	3,436	27.387	59,463(b)	256, 360
Aluminium in nice ingots	09100	nigoui	009100(0)	~~~,~~~
blocks notch hors slahs				
billets and blooms	1 694	36 951	517	11 951
Aluminium donon	5 261	70 045	6 889	120,000
Aluminium du hann mode and mine	1 047	10,040	7,000	104 050
Aluminium in pars, roas and wire	1,941	00,001	5,906	124,000
Aluminium in plates, sneets and	10 744	750 700	14 075	400 070
strips, including circles	12, 544	336,760	14,215	422,000
Aluminium pipes and tubes	638	31,521	513	27,299
Aluminium leaf, less than .005 mm	•	7 7 777		0 770
Thick	0.00	5,100	000	0,210
Aluminium kitchen or household		04 300		001 700
hollowware, noospo assessessesses	000	84,179	000	67,129
Aluminium, manufactures of, n.o.p.	008	468,901	000	669,715
Aluminium leaf, n.o.p., or foil				
Less than .005 inch thick,		20.000		07 507
plain or embossed	0.00	62,908	800	87,597
Aluminium powder Ib.	67,419	30,025	109,777	39,372
Other	000	7,597	000	10,649
TOTAL ALUMINIUM AND ITS PRODUCTS		4,139,528	000	4,526,227

(a) 1,710,817 cwt. from United States and 1,528,655 cwt. from British Guiana.
(b) 56,000 cwt. from Greenland.

CRYOLITE,	1935 and 19	36. (con	cluded)		
		1 9	3 5	1 9	3 6
		Cwt.	\$	Cwt.	\$
EXPORTS					
Aluminium scran		26,130	348,623	20.46]	273.866
Aluminium in hars, blocks,	etc		010,000	~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	,
To - United Kingdom	0000	337.204	5.868.348	415,163	8.012.135
United States		50,101	747,978	26.487	487.446
Ttalv		4.411	70,184	209101	101,110
Brazil		732	15 396	897	16 895
China		7,801	131,687	15 024	248,061
Auctralia		10,527	227 566	7 264	153 042
Janan		121 656	1.922.774	87,821	1.480.121
Germansr		2	23	2.444	32,635
British India		3-234	63.041	3.887	77,538
Belgium		5.845	88,527	549	17,552
Mexico		1.096	24,605	994	22.773
Switzerland		47.728	744,331	6,613	113,664
Other countries .		9.245	116.878	8,959	178.765
Total in bars. b	locks.etc	599.582	10.021.338	576.102	10.840.627
Aluminium kitchon utoncile	and				
hallowwana	anu		13 910		20 202
Aluminium manufectures of			277 519		262 761
Aluminium, manufactures of	, novopo ece		10 700 000	000	000,101
(From the Year Bod	ok of the Am (in me	erican Bur tric tons)	eau of Meta		.cs)
Lountry	1920	т.а	ку I	900	1990
United States	65 800	102	100	54 113	102 028
Canada	17,800	42	000	20 556	26,900
Total North America	83,600	144.	100	74.669	128.928
France -	07 000	00	007	22 200	20 700
Trance	21,000	~?,	700	1,000	12,000
	20,600	22	700	700	07 100
Germany (a)	50,600	00,	700	2 500	97,400
Austria (a)	3,000	6,9	100	2,000	3,000
Great Britain (a)	7,000	10,	140	1007	16,000
Ttol-	1 000	~J,	146 - 777 -	15 100	16,000
Lualy assessessessessesses	1,500	()	000	1 200	1 500
Dparis	000	1,		24 500	27 000
Swadan	600			1 817	1,000
Totel Europe	111 800	137	198 1'	79 404	229 500
Teres	TTT 000	1.07 %		4 000	E 000
Japan			0 6 3	4,000	5,000
TOTAL WORLD (b)	195,400	281,	298 28	073	363,428
(a) Metallgesellschaft.	(b) Omitted	from this	table are s	all produ	ctions in

Table 1 - IMPORTS INTO CANADA AND EXPORTS OF ALUMINIUM, ALUMINA BAUXITE AND CRYOLITE 1935 and 1936 (concluded)

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Belgium and Hungary.

Table 3 - WORLD'S PRODUCTION OF BAUXITE	AND CRYOLITE,	1933, 1934 an	nd 1935.
(laken from the Imperial Insti of the British	Empire and For	eign Countrie	es)
(Long	tons)		
Producing Country	1933	1934	1935
BRITISH EMPIRE			
Northern Ireland British Guiana - (c)	698	57	
60% or more alumina	32,441	50,998	107,785
50-60% alumina	716	2,225	3,414
30-50% alumina (b)	8,173	11,666	26,410
India	1,075	18	7,635
AUS UTALLA	44.000	<u>1,113</u>	1,100
10 UCL	44,000	65,000	140,000
FOREIGN COUNTRIES			
France	482,750	520,150	504,722
Germany	1,700	6,456	8,412
Greece		0	9,339
Hungary	71,281	182,069	207,745
Italy	93, 320	129,193	167,378
Roumania	1,138	1,435	1,450
Spain	2,500	1 1 22 222	(a)
U.S.S.R. (Russia)	49,800	(e)'60,000	(e)130,000
Iugoslavia	85,214	80,489	X12, 694
Inited States	154 176	157 838	233 912
Dutch Guiana (d)	104,697	99.412	113.370
Netherlands East Indies	600	009120	9.766
Total (x)	1,050,000	1,240,000	1,590,000
WORLD'S TOTAL (x)	1,090,000	1,310,000	1,740,000

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(x) Excluding the production in Austria, statistics of which are not available.

(a) Information not available.

(b) Ore remains at the mines.

(c) The shipments from mines of dried and washed ore were as follows:-

	1933	1934	1935
Metallurgical	10,273	20,406	73,178
Chemical	25,095	28,181	37,562
Refractory	716	1,775	3,414

(d) Exports.

(e) Estimated.

PRODUCTION (EXPORTS) OF	CRYOLITE	IN	GREENLANI
TICODOCTION	and the set of the set of	1 22	And the Wards and the set of the	nim da V	And the Wagned strends & sheet in their & store

Year		Long tons
1933		10,187
1934		14,999
1935	000000000000000000000000000000000000000	23,104

--5--ANTIMONY

No commercial production of metallic antimony has occurred in Canada since 1917 and no by-product output of the metal since 1926 in which year it was reported as being contained in silver-lead-bismuth bullion produced from the cobalt-silver ores of Northern Ontario. The greater part of the refined antimony made in Canada was produced at Trail, British Columbia, during the years 1907, 1909, 1915 and 1916 by the Consolidated Mining and Smelting Company of Canada, Limited, the metal being recovered in the treatment of silver-lead ores. It was recently announced that the metal would again be produced at Trail, British Columbia, in 1938.

Minerals containing antimony occur in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, and British Columbia, also in the Yukon Territory. No commercial shipments of antimony ores, known as such, have been made in Canada for many years. Stibnite (Sb2S3) occurs in the veins of the Reliance Gold Mines, Bridge River mining district, British Columbia, and it was reported in the press during 1937 that this property might be reopened for the purpose of mining antimony ore. The mineral also occurs on the property of the Gray Rock Mining Syndicate in the Truax Creek area of the same province and the British Columbia Department of Mines reports - "The antimony content is of interest if, at a more advanced stage of development, it can be shown that a clean stibnite concentrate can be made." It was also announced that antimony ore was being mined during the latter part of 1937 at the Congress mine adjoining the Reliance property.

According to the United States Bureau of Mines, the world production of antimony in 1936, stimulated by the high prices of the past two years, increased 15 per cent over that of 1935. The estimated production of 31,000 metric tons in 1936 almost equalled the 1929 output. China's output decreased slightly, but in 1936 it continued to be the principal producer, having contributed 53 per cent of the estimated total. The average New York price for Chinese antimony in 1936 was 12.97 cents per pound (duty paid), a decline of 8 per cent from 1935. Over half of the primary antimony consumed in the United States is used in the manufacture of such products as storage batteries, cable covering and bearing metals.

"Metal and Mineral Markets" - New York - quoted antimony ore -November, 1937 - per unit of antimony contained, \$1.80 to \$2.20 f.o.b. New York. London, per long ton unit, 7s. 9d. to 8s, 3d. for 60 to 65 per cent sulphide ore.

Table 4 - ANTIMONY USED IN SPECIFIED	CANADIAN I	NDUSTRIES,	1934 and 1935.	Lange Co.
	1 9	3 4	1 9 3	5
Industry	Pounds	\$	Pounds	\$
White metal alloys Electrical apparatus and supplies.	385,052(x 193,811) 32,212 10,624	595,733(x) 130,380	73,048 15,267

(x) Regulus.

NOTE - Corresponding data for 1936 not yet available.

Table 5 - IMPORTS OF ANTIMONY RND ANTIMO	NY PRODUCTS I	NTO CANADA, 1	935 and 1936.
	1 9	3 5	1 9 3 6
	Pounds	\$ P	ounds \$
Antimony or regulus of, not ground, pulverized or otherwise treated Antimony oxide and titanium oxide (x) Antimony salts - tartar emetic, etc Antimony salts for dyeing	926,959 2,870,491 48,516 112	113,072 1,2 310,083 4,1 7,907 40	79,535 109,656 98,017 424,451 45,356 7,149 366 40
(x) Including white pigments containing titanium.	not less than	14 per cent	by weight of
Table 6 - WORLD'S PRODUCTION OF ANTIMONY (Taken from the Imperial Insti of the British (in term (Long	ORE, 1933, 1 tute's public Empire and Fo as of metal) tons)	934 and 1935. ation - The M reign Countri	ineral Industry es)
Producing Country	1933	1934	1935
BRITISH EMPIRE			
Jnion of South Africa	000		5
India actuation and a second a s	0 0 0		20
Australia	47	9	20
FOREIGN COUNTRIES			
Zechoslovakia	1.341	1.142	2.391
France	379	261	(a)
Freece	168	90	40
Italy	358	346	446
lugoslavia	000	010	72
llopria	100	650	1 008
Inracco (French)	100	000	135
lorôcco (Spanich)	0 0 U	309	(9)
lovi co	1 010	2 626	1 198
Inited Ctates (b)	1,010	201	7,430
JALUEU DUAUES (D) asaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	10	106	09
argentina soccessossessessessessesses	7 000	000	
Solivia (exports)	1,866	1,182	0,048
eru voeccoccoccoccoccoccoccocco	18	73	308
	13,100	15,200	18,000
apan seesseesseesseesseesseessees	33	27	40
lorea	7	000	2
lurkey	334	33	101
rench Indo-China	000	000	17

(a) Information not available.
(b) Secondary metal was recovered as follows:-

1933	0	ų	0	0	Q	э	0	a			0	6,600 long	tons
1934	0	0		5	9	0	0	0	0	0	5	6,700 "	11
1935	0	0	0	0		5	0	0	0		0	8,600 "	11

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BARIUM

Barium metal is used in relatively small quantities for the manufacture of certain electrical equipment; nickel-barium and nickel-copper-barium alloys, in the form of wire, have been employed in spark plug construction owing to their high thermionic electron emission. The metal has also been utilized in the vacuum tube industry because of its ability to remove the last traces of gases and to emit electrons easily. Barium has been produced in the United States, Germany, France and Great Britain but not yet commercially in Canada. A series of lead-calcium-barium alloys are used for bearing purposes. A range of bariumaluminium and barium-magnesium alloys are produced in England. The price of the metal in the United States is now below \$7.50 per pound.

BERYLLIUM

The principal ore of beryllium is the mineral beryl - Be3Al2(SiO3)6. There are several known occurrences of this mineral in Canada and shipments of beryl have been made for experimental purposes from deposits in Renfrew county, Ontario, and the Oiseau river area in Manitoba. Beryl usually occurs in pegmatites and is sometimes recovered as a by-product in the mining of the feldspar and mica content of these rocks. During 1936 Renfrew Minerals Limited reported the recovery of several tons of hand-picked beryl from a property worked in Lyndoch township, Renfrew county, Ontario, however, no commercial shipments of the mineral were reported in Canada during the year under review.

Beryl has been extensively worked in the Jaipur State, Rajputana, India, where it is found in mica-bearing pegmatites. The output in 1935 was 139 tons and was exported to the United States and Germany.

Sporadic occurrences of beryl in the form of large crystals in pegmatites have been located over an extensive area in Namaqualand, Cape Province, South Africa. Only small quantities have been recovered, the production in 1936 amounting to 5.3 short tons valued at £38 compared with 58 tons worth £421 in 1935.

Interest in the supply and uses of beryllium has increased greatly in recent years and research continues to find new uses for beryllium alloys. In the United States beryllium-copper alloys have leading interest while in Germany considerable progress has been made with nickel-base beryllium alloys. According to the United States Bureau of Mines, a close co-operation is maintained between the American producers of beryllium master alloys and leading German interests.

BISMUTH

Bismuth production in Canada represents the metal recovered from silverlead ores smelted at Trail, British Columbia, and the metal contained in silverlead-bismuth bullion produced in the treatment of silver-cobalt ores at Deloro, Ontario.

Canadian production of bismuth, as described, totalled 364,165 pounds valued at \$360,523 in 1936 compared with an output of 13,797 pounds valued at \$13,245 in 1935. Of the 1936 production, 3,552 pounds valued at \$3,516 were credited to Ontario and 360,613 pounds at \$357,007 to British Columbia. The output of the metal during 1936 was the greatest ever recorded in the Canadian mining industry. The chief bismuth producing countries include Germany, Peru, United States, Japan, Canada and Spain, and the grearter part of the world's production of the metal represents a by-product in the treatment of lead, copper, silver, gold and tin ores.

Most of the world's bismuth output is consumed for medicinal and pharmaceutical purposes, recently, however, its use in industry has been increasing. It is now utilized in the manufacture of low melting alloys such as sprinkler nozzles. It is also employed in enamelling and the manufacture of optical glass, aluminium alloys, and iron castings.

"Metal and Mineral Markets" - New York - quoted (November, 1937) bismuth at \$1 per pound in ton lots. London, 4s.

Table 7 - PRODUCTION OF BISMUTH IN CANADA, 1927 - 1936.

Year	Pounds	\$	Year	Pounds	\$
1927	2,072	1,033	1932	16,855	7,340
1928	14,002	5,067	1933	78,303	81,526
1929	194,329	307,114	1934	253,644	301,215
1930	12,732	6,366	1935	13,797	13,245
1931	118,207	157,650	1936	364,165	360,523

Table 8 - BISMUTH USED IN THE MANUFACTURE OF CANADIAN MEDICINAL AND PHARMACHUTICAL

PREPARATIONS, 1934 and 1935.

	1 9	3 4	19	3 5
Item	Pounds	\$	Pounds	\$
Bismuth metal	31,365 11,554	31,500 18,735	34,276 10,927	26,170 18,027

Imports into Canada of metallic bismuth, in its natural state, totalled 29 pounds valued at \$35 in 1936 compared with 2,048 pounds worth \$1,675 in 1935.

Table 9 - WORLD'S PRODUCTION OF BISHUTH ORE. (Taken from the Imperial Institute of the British Empire a (Cwt.)	ETC.(x), 1 a's publicat and Foreign	1933, 1934 an tion - The Min Countries)	<u>d 1935</u> . neral Industry
Producing Country and Description	1933	1934	1935
BRITISH EMPIRE Union of South Africa - Ore (Bi content) Canada - Metal and content of bullion	69 9	2,265	4 123
Australia - Ore, etc.	80 1b ₀ 53	297	2 470

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Table 9 - WORLD'S PRODUCTION OF BISMUTH ORE, EIC.(x), 1955, 1954 and 1955. (concluded) (Cwt.)			
Producing Country and Description	1933	1934	1935
FOREIGN COUNTRIES			
Germany (Saxony) - Ore (Bi content)		(a)	80
Norway - Copper ore (Bi content)			16
Roumania - Ore			280
Spain - Ore	1,516	3,543	(a)
Metal	512	905	(a)
Mexico - Ore (Bi content)	923	2,033	4,204
Argentina - Ore		180	1,300
Bolivia (exports) - Ore. etc. (Bi content)	37	993	412
Peru - Lead-silver bullion, etc. (Bi content)	1,607	2,358	193
Metal	4,149	3,014	2,967
China - Ore (Bi content)	350	570	(a)
Japan - Metal	1,124	991	1,060

(x) Bismuth is also recovered as a by-product in the United Kingdom, France, Sweden, U.S.S.R. (Russia) and the United States.

(a) Information not available.

CADMIUM

Canadian production of cadmium represents the recovery of the metal as a by-product in the electrolytic refining of zinc. Production up to 1935 came entirely from the treatment of zinc-bearing ores at Trail, British Columbia, by the Consolidated Mining and Smelting Company of Canada, Limited. The commercial production of the metal from the copper-gold-silver-zinc ores of the Flin Flon mine was commenced in Manitoba for the first time in 1936. Production of cadmium in the Dominion during 1936 totalled 785,916 pounds valued at \$699,465 compared with 580,530 pounds worth \$441,205 in 1935. Of the 1936 output, 526.034 pounds valued at \$468.170 were credited to British Columbia, 148,133 pounds at \$131,838 to Manitoba and 111,749 pounds at \$99,457 to Saskatchewan. The proportioning of the cadmium recovered from the Flin Flon mine ores between Manitoba and Saskatchewan results from the interprovincial boundary intersecting The quantity and value of cadmium production in the entire the deposit. Dominion during 1936 were the highest ever recorded.

The greater part of the world's cadmium output is consumed in the manufacture of alloys and compounds and as a plating material. In a review of cadmium in 1936, the United States Bureau of Mines states - "The future of cadmium alloys in automobile bearings seems to depend upon the ability of producers to furnish adequate supplies of the metal at prices below those prevailing in recent years. The problem of producing lubricants that will not corrode cadmium alloys apparently has been solved. The use of cadmium in compounds increased in 1936. Production of cadmium lithopone, which was curtailed sharply in 1935 because of shortage of supplies, increased materially, and the manufacture of sulphides increased substantially also. World production of cadmium in 1936 is estimated at 3,665 metric tons."

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"Metal and Mineral Markets" - New York - quoted cadmium (November, 1937) - per pound, producers' minimum price on quantity business, commercial sticks, \$1.25; patented shapes, to platers, \$1.60. Prices largely nominal London quotes 6s. to 7s. per pound.

	BRITISH	COLUMBIA	MANITOBA		SASKATCHEWAN	
Years	Pounds	\$	Pounds	\$	Pounds	\$
			* *			
1928	491,894	341,374				
1929	773,976	675,294	040	040		
1930	456,582	337,871	000	000		
1931	323,139	180,958		0 6 8		
1932	65,425	26,824	222	000		
1933	246,041	78,733	300			
1934	293,611	95,665				
1935	580,530	441,203	200	000		
1936	526,034	468,170	148,133	131,838	111,749	99,457

Table 10 - CADMIT	M PRODUCTION	IN	CANADA.	1928	- 1936.
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In 1935 there were 72,104 pounds of cadmium valued at \$60,716 used in the Canadian white metal alloys industry; the consumption of the metal in the same industry during 1936 was 48,939 pounds worth \$41,561.

Statistics relating to Canadian exports or possible imports of cadmium are not published separately by the Department of National Revenue, Ottawa.

Table 11 - WORLD'S PRODUCTION OF CADMIUM, 1933, 1934 and 1935.

(Taken from the Imperial Institute's publication - The Mineral Industry of the British Empire and Foreign Countries) (Lb. avdp.)				
Producing Country	1933	1934	1935	
BRITISH EMPIRE				
South West Africa (d)	000	140,000	320,000	
Canada	(c)246,041	(c)293,611	580,530	
Australia	357,313	380,493	489,666	
FOREIGN COUNTRIES				
Belgium	355,000	498,245	332,903	
France and and a second	88,000	000	266,754	
Italy	15,287	17,600	35,300	
NOTWAY ARACARARARARARARARARARARARARARARARARARA	308,000	302,030	260,143	
Poland	114.000	316,486	248,458	
II S. S. R. (Bussia)	(a)	5,700	26,400	
United States - Metal	2.276.933	2.777.384	3,477,091	
Compounds (metal				
content).	401.400	566,700	507,400	
Mexico (b)	1,107,073	848,149	1,317,321	

Cadmium is also produced in Germany, Sweden and Japan.

(a) Information not available.
(b) Including cadmium content of flue dust, etc., exported for treatment.
(c) Excluding cadmium precipitate produced at Flin Flon.

(d) Cadmium content of shipments of dust from the smelters to Germany.

CALCIUM

Calcium has been employed as a hardening agent in certain lead alloys and for the debismuthizing of lead, also as a deoxidizer for copper and its alloys and deoxidizing and grain-refining cast iron, nickel, and nickel alloys. The metal is not made in Canada; in the United States it is produced from calcium carbide.

Calcium is quoted in the United States at 75 cents per pound, in ton lots, for a 98 to 99 per cent product.

There is no published record of any Canadian imports of calcium metal during either 1935 or 1936.

CHROMI TE

The mineral chromite (FeO, Cr2O3) is the commercial source of the metal chromium; it is also used extensively in the manufacture of refractory brick. The metal is a necessary constituent of many high-speed cutting tools, certain armour plate, and stainless steels.

The principal chromite producing countries are Russia, South Africa, Turkey, Southern Rhodesia, Cuba, New Caledonia, Yugoslavia, and India. Production of the mineral in Canada during recent years has been relatively small, coming almost entirely from the Eastern Townships, Quebec. During the past few years considerable development work was conducted on a chromite deposit located at Obongo Lake, in the Thunder Bay district of Ontario; comparatively small shipments were made from this property in 1935 and 1936. The owners of this mine, the Chromium Mining and Smelting Corp. Ltd., also erected and placed in operation a modern electric smelting plant at Sault Ste. Marie, Ontario, for the production of ferrochrome and ferrosilicon.

The total value of chromite produced in Canada during 1936 was \$13,578, of which \$8,508 were credited to Quebec mines and \$5,070 to Ontariô. Production of the mineral in Canada during the first six months of 1937 totalled 210 short tons valued at \$3,286.

Statistics relating to Canadian imports or possible exports of chromite are not published separately.

November, 1937, chrome ore quotations by "Metal and Mineral Markets" -New York - were:- Long ton, c.i.f. Atlantic ports, Indian ores, \$22 to \$23 for 45 to 47 per cent Cr₂O₃ ore, and \$26 to \$26.50 for 48 to 50 per cent ore. Russian ores: 45 per cent Cr₂O₃, nominal. London 100s. to 110s. for 48 per cent Rhodesian, and 110s. to 115s. for 55 to 57 per cent New Caledonian.- quotations nominal.

Table 12 - PRODUCTION OF CHROMITE IN CANADA, 1927 - 1936.

short tons	\$	Year	short tons	\$
		1932	78	1,113
		1933	30	343
126	900	1934	111	1,578
		1935	1,144	14,947
	short tons	short tons \$	short tons \$ Year 1932 1933 126 900 1934 1935	short tons \$ Year short tons 1932 78 1933 30 126 900 1934 111 1935 1,144

(a) Quantity not published.

-12-Table 13 - IMPORTS OF CHROMIUM AND CHROMIUM PRODUCTS INTO CANADA, 1935 and 1936.

	193	5	1 9	3 6
Tron Protects The second states with the second	Quantity	\$	Quantity	\$
Chromium metal and tungsten metal, in lumps				
etc., when imported by manufacturers for				
alloying purposes lb.	36,007	22,454	140,834	60,382
Nickel chromium in bars or rods not more				
than 0.75 inches diam. containing 60%/				
nickel and 10%/ chromium for use as				
electric resistance wire, etc 1b.	43,434	41,381	52,825	51,170
Chrome fire brick XX	000	46,882	000	68,082
Bichromate of potash - crude lb.	151,336	12,150	139,735	11,556
Bichromate of soda lb.	2,634,271	148,421	2,959,488	178,167

Table 14 - CONSUMPTION OF CERTAIN CHROMIUM PRODUCTS AND CHROME ORE IN SPECIFIED CANADIAN INDUSTRIES, 1935 and 1936,

		1 9	3 5	1 9 3	6
Industry	Item	Pounds	\$	Pounds	\$
Ingots and Castings Ingots and Castings	- Chrome ore	465, 9 20 (a)	6,269 (a)	725,760 1,223,040	9,965 106,961
Paints, Pigments and Varnishes	- Chrome colours	1,141,200	175,401	1,333,542	193,794
Varnishes Leather Tanning	- Sodium bichromate . - Sodium bichromate .	475,121 1,550,165	36,602 115,393	530,521 1,789,054	41,867 151,496

<u>NOTE</u> - In addition to the items listed above, a considerable quantity of chromite is utilized in the manufacture of Canadian ferro-alloys, also a relatively small quantity of sodium bichromate is consumed in the chemical industry. (a) Not shown separately.

Table 15 - WORLD'S PRODUCTION OF CHROME ORE AND CHROMIUM, 1933, 1934 and 1935. (Taken from the Imperial Institute's publication - The Mineral Industry of the British Empire and Foreign Countries) (Long tons)

Producing Country	1933	1934	1935
DDTHT CIT DAIDTDD			
BRITION EMPIRE	74 407	70 001	204 940
Southern Knodesla	54,495	10,901	104, 240
Union of South Africa	33,541	60,388	89,003
Cyprus	000	966	1,179
Canada	27	99	1,022
Tudia	15 596	21 576	30 197
LIGLE commencemencemencemencemence	10,000	KL, UIO	009161
Australia	891	1,716	595
TOTAL	84,000	156,000	235,000
FOREIGN COUNTRIES			
Bulgaria	1.67	84	320
Grando	14 550	30,209	20,309(0)
	23,000	17	20,000(0)
NOTWAY	LAC	41	000
Roumania	29	000	000

(Long tons)				
Producing Country	1933	1934	1935	
FOREIGN COUNTRIES (concluded)				
U.S.S.R. (Russia)	110,948	127,159	(a)	
Yugoslavia	25,062	46,604	59,453	
Cuba	21,837	57,325	47,743(b)	
Guatemala (b)	2,061	792	0.00	
United States	966	341	440	
Japan	19,681	26,792	35,736	
Philippine Islands (c)	000		1.272	
Turkey	74,188	117,951	148,096	
New Caledonia	49,100	54,300	54,430	
Total	319,000	462,000	(a)	
WORLD'S TOTAL	403,000	618,000	(a)	

Table 15 - WORLD'S PRODUCTION OF CHROME ORE AND CHROMIUM, 1933, 1934 and 1935. (concluded)

(a) Information not available.

(b) Imports into the United States from the country indicated.

(c) Exports.

IRON ORE

No iron ores, known as such, have been mined in Canada for some years. Nova Scotia with its large iron and steel industry is not a producer of iron ore. The large deposits of high grade ore in Newfoundland, owned by the Dominion Steel and Coal Corporation, are much more readily accessible and of a higher and more constant grade than the iron ore deposits in Nova Scotia.

Iron ore was first mined and smelted in the province of Quebec early in the eighteenth century, and from that time until 1883, the industry was carried on almost continuously at Three Rivers in the St. Maurice district. Other furnaces using local ore were operated at Radnor Forges and Drummondville, the last to shut down being the Drummondville furnace in 1911. At the present time only titaniferous ore is mined in Quebec; this ore is produced near Baie St. Paul and is shipped for its titanium content.

More iron ore has been produced in Ontario than in any other province; in northwestern Ontario, about 1899, a deposit of hematite, that later developed into the Helen mine, was found. This property was the main source of Ontario's iron ore output for a number of years. The province has a large supply of low-grade iron ore, but beneficiation processes must be applied to make these ores suitable for commercial use.

Different varieties of iron ore are found in various parts of British Columbia, the most important of which are the magnetite deposits which occur on the islands along the coast.

A report issued by the Bureau of Mines, Ottawa, states that the Algoma Steel Corporation's new Helen mine in the Michipicoten district of Ontario has proved reserves variously estimated at 60,000,000 to 80,000,000 tons of iron carbonate rather high in sulphur that requires roasting to fit it for use in the blast furnace. In the Sudbury district, Moose Mountain Ltd, has developed some

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33,000,000 tons of proved and provable ore consisting of low-grade silicious magnetite carrying, in its natural state, about 35 per cent of iron.

A revival in iron ore mining in Ontario is indicated by the fact that during the summer of 1937 the Algoma Properties Ltd.commenced rebuilding the surface equipment at the new Helen mine and sampling of the Moose Mountain mine was started by the M. A. Hanna Co. of Cleveland, Ohio. An act passed by the Ontario Legislature has provided for a bounty of two cents per unit of iron content for a period of ten years commencing January 1st, 1939.

Imports of iron ore into Canada during 1936 totalled 1,317,033 short tons valued at \$2,633,925 compared with 1,509,933 tons worth \$2,960,207 in 1935. Of the 1936 imports, 755,414 tons worth \$1,598,704 came from the United States, 489,036 tons at \$873,393 from Newfoundland, 36,209 tons at \$82,962 from Brazil, 10,808 tons at \$19,071 from Morocco and 8,316 tons worth \$28,413 from Norway.

Iron ore quotations (November, 1937) - per long ton, lower lake ports -Lake Superior ore: Mesabi, non-bessemer, $5l_2^{\frac{1}{2}}$ per cent iron \$4.95; non-bessemer, \$5.10. Eastern ores delivered at furnace, cents per long ton unit, foundry and basic 56 to 63 per cent, 9 to 10 cents.

Table 16 - WORLD'S PRODUCTION OF IRON ORE(x) 1933, 1934 and 1935. (Taken from the Imperial Institute's publication - The Mineral Industry of the British Empire and Foreign Countries) (Long tons)					
Producing Country	1933	1934	1935		
BRITISH EMPIRE					
United Kingdom (b)	7,461,9720	10,586,846	10,895,385		
Sierra Leone (exports)	24,550	210,645	433,540		
Union of South Africa	67,496	229,494	299,247		
Newfoundland	320,891	506,616	662,441		
India	1,228,625	1,916,918	2,364,297		
Unfederated Malay States	766,527	1,135,649	1,411,636		
Australia	736,604	1,263,708	1,874,418		
New Zealand	6,572	2,806	10,646		
TOTAL	10,600,000	15.800.000	17,950,000		
TODET ON CONNUCTED					
FURLIGN COUNTRIES	000 014	450 400	007 205		
Austria actes a service a conserve a conserv	262,814	459,462	765,175		
Belgium	104,523	114,060	161,920		
Bulgaria	5 U V	000	2,333		
Czechoslovakia	422,000	530,233	719,512		
France	29,767,145	31,509,515	31,821,597		
Germany	2,550,513	4,274,092	5,947,855		
Greece	83,875	1.45,080	200,922		
Hungary	49,231	67,775	189,357		
Italy	517,294	494,153	559,771		
Luxemburg	3,309,312	3,773,297	4,068,520		
Norway	466,379	558,452	753,067		
Poland	270,161	243,458	327,059		
Portugal	4,400	2,849	866		
Roumania	13,613	82,270	91,932		
Spain	1,786,811	2,060,929	2,591,570		

Table 16 - WORLD'S PRODUCTION OF	IRON ORE(x), 193 (Long tons)	53, 1934 and 193	35. (concluded)
Producing Country	1933	1934	1935
FOREIGN COUNTRIES (concluded) Sweden Switzerland U.S.S.R. (Russia) Yugoslavia Algeria Belgian Congo Egypt Morocco (Spanish) Tunis Cuba Mexico United States (d) Brazil (estimated)	2,656,127 (c) 14,294,000 50,925 749,426 69 507,692 286,000 275,197 76,486 17,744,819 30,000 556,246	5,170,093 (c) 21,289,000 177,002 1,305,488 (a) 200 811,785 537,900 96,500 104,128 24,809,438 30,000 957,800	7,807,566 3,800 26,635,000 231,022 1,648,160 (a) 15 1,149,165 495,000 (a) (a) (a) 31,008,184 30,000 835,987
China French Indo-China Japan Korea "Manchoukuo" Philippine Islands (exports) TOTAL WORLD'S TOTAL	1,118,500 405 315,605 '514,000 1,158,060 80,000,000 91,000,000	1,338,100 1,512 424,863 561,454 1,115,471 7,125 103,000,000 119,000,000	(a) 620 507,718 588,663 1,454,598 278,836 120,000,000 138,000,000

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(x) Including manganiferous iron ore,

(a) Information not available.

(b) In addition bog ore and iron ore (not used for smelting) were produced as follows -

-		2	-	-	-	2	-		-	-	-	2	-	2		h	-	+	-		m	9	5	0	n	1	-	he	71	0	N
19	3	5		ų		0	0	2	0	0	•	0	0				0					7	,	98	6	1	01	ng	t	on	S
19	3	4		а		ų					0	0	•	0				0		0		9	,	70	9	1	01	ng	t	on	S
19	3	3		•	0	•		5		0	•		0		•	•		0		•		8	,	25	6	1	01	ng	t	on	S

(c) Production for last decade varied between 25,000 and 70,000 tons, except in 1935 when production was 3,800 tons.

(d) Including shipments of manganiferous iron ore up to 35 per cent. Mn.

LITHIUM

The principal commercial lithium ores are amblygonite, a fluophosphate of lithium and aluminium; spodumene, a silicate of these two elements, and lepidolite, or lithia mica, also a silicate. The lithia content of these minerals, as mined, commonly ranges around 8 to 9 per cent for amblygonite, 4 to 8 per cent for spodumene, and 3 to 5 per cent for lepidolite. All of the above minerals are known to occur in Canada, but there has, as yet, been only a small production, mainly of lepidolite and spodumene. The important deposits are all in Manitoba in the southeastern part of the province. The first commercial shipment of Canadian lithium ore to be officially recorded was reported during the first six months of 1937. This production came from deposits located at Benic Lake, Manitoba, and was valued at \$1,202; the mineral was consigned to the United States for the manufacture of lithium compounds and possibly lithium metal. Lithium is the lightest solid substance known, being only half as dense as water. According to the United States Bureau of Mines, alloys of lithium and aluminium, lead, zinc, and probably magnesium, appear to be of value in engineering, and lithium may be used as a scavenging agent for iron, copper, nickel and their alloys; lithium-copper and lithium-treated conductivity bronzes are now produced on a fairly large scale, and for a number of years there has been a steady output of lithium-hardened bearing metal alloys. Soodumene has recently attracted some attention for glass making

Supplies of amblygonite and spodumene in the United States have come principally from South Dakota; during 1936 production of lithium minerals in the United States totalled 1,239 short tons valued at \$25,273.

The following table shows the production of lithium mica in the specified countries for 1933, 1934 and 1935.

Table 17 -

	<u>1933</u> (Long tons)	<u>1934</u> (Long tons)	<u>1935</u> (Long tons)
South West Africa		231	489
France	500	1,200	(a)
Germany	72	(a)	(a)
Portugal	870	294	8

(a) Information not available.

Statistics relating to possible imports of lithium, lithium ores or lithium compounds are not shown separately in Canadian trade reports.

The United States Bureau of Mines reported that prices of amblygonite tended slightly upward in 1936. Although still quoted nominally at \$34 to \$35 per short ton, f.o.b. South Dakota mines, actual sales were made at prices up to \$40 a ton for 8 to 9 per cent material. The price of spodumene is about \$20, f.o.b. South Dakota mines. Lepidolite, per ton, \$20 to \$25, for ordinary grades.

MAGNESTUM

The rapid development of aviation and the growing importance of the air arm for military purposes has caused the question of magnesium production to be seriously regarded in all the more important countries. The metal is not produced commercially in Canada.

Magnesium is reviewed, in part, by the United States Bureau of Mines, as follows - "The world magnesium industry made rapid strides in 1936. Several countries began producing for the first time, and others expanded their output and improved their processes. Germany remained by far the chief producer. Increased activity abroad was due largely to armament and self-sufficiency programmes although new commercial uses and improved business conditions also were important factors. In Europe as well as the United States the use of magnesium alloys in aircraft, transportation, and portable equipment is extensive and growing rapidly. The Dow Chemical Company of Midland, Michigan, continued to be the sole producer of magnesium in the United States in 1936; the metal is recovered from natural brines. The principal uses of the metal at present are as a deoxidizer in the metallurgical treatment of other metals and in the manufacture of light alloys. On a volume basis, 1 pound of magnesium equals

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1¹/₂ pounds of aluminium and about 5 pounds of copper. The high-magnesium alloys are known to the world trade by various names, such as magnalium, Dowmetal, Elektron, A. M. alloys, Bohnalite X, Hydronalium and Maxium. An improved process for the manufacture of magnesium from magnesite is said to have been developed in Austria. The world producers of magnesium in apparent order of importance are Germany, United States, France, Switzerland, United Kingdom, Japan, Russia, and Austria; a conservative estimate of world production of magnesium in 1936 was 15,000 metric tons."

Data relating to Canadian imports of magnesium metal are not published separately.

United States quotations for magnesium metal (November, 1937) were per pound - ingots (4x16 in.) 99.8 per cent, 30 cents in carloads; 32 cents in 100 pound lots or more. L.C.L.

MANGANESE ORE

Producers' shipments of manganese ore in Canada during 1936 totalled 221 short tons valued at \$1,596 compared with 100 tons worth \$300 in 1935. The ore in 1936 came entirely from New Brunswick where shipments to steel plants were made from properties located at Turtle Creek and Gowland Mountain (Elgin) in Albert county.

The Department of Mines, Ottawa, reports that the manganese ores, which have been mined in Canada are pyrolusite, manganite, psilomelane, and bog manganese. These, with the exception of the bog manganese, were mostly ores with a high manganese content and fairly free from deleterious constituents. They were usually in small lots and were derived from various localities in Nova Scotia, New Brunswick and British Columbia. The Nova Scotia Department of Mines stated that during 1936 the Atlantic Manganese Corporation Ltd. carried on further work at its property located in the New Ross section of Lunenburg county. The work was confined to the 90 foot level in the number 2 shaft where a drift was carried east for 165 feet following a lead of iron oxide and manganese; no shipments of ore were reported.

The National Association of Purchasing Agents, New York, states in its report A - 19, of October, 1936: "It is estimated that more than 90 per cent of the world's consumption of manganese ore is in the manufacture of iron and steel. Most of the manganese ore entering the ferrous metallurgical industry is used in making ferromanganese and spiegeleisen, the forms in which manganese is usually added to steel. Silico-ferromanganese and silicaspiegel are used in certain grades of steel and may replace ferromanganese and spiegeleisen. Considerable manganese ore is also added to the pig-iron blast furnace charge when the iron-ore burdens are deficient in manganese. Manganese steels are utilized in the manufacture of plates, shapes, structural bars, open-hearth rails, spring steels, car wheels, tires, axles and for many other purposes where toughness and resistance to abrasion is required. Manganese is also used in the formation of alloys of copper, zinc, aluminium and other metals. Probably the most extensive chemical use of manganese ore is in the manufacture of dry cells; another outlet taking advantage of the oxidizing power of manganese dioxide is in the glass and ceramic industry; fine glassware is almost entirely decolorized by the addition of manganese oxide. Manganese compounds are used extensively as driers in the preparation of varnish and paint, due to their catalytic properties; manganese ore required for this use must be of relatively high grade. The manufacture of manganates and the permangates for use as

germicides and deodizers is now an important branch of the chemical industry; the permangates are also used for bleaching in the textile industry.

In 1936, Canada imported 1,285,242 cwt. of manganese oxide valued at \$684,175 compared with 735,609 cwt. worth \$353,414 in 1935. Of the 1936 imports, 40,073 cwt. valued at \$83,373 came from the United States, 112,000 cwt. valued at \$34,615 came from British South Africa, and 1,132,200 cwt. at \$560,844 came from the Gold Coast

Tons	Value	Years	Tons	Value \$
1				
200	1,400	1931	117	2,893
584	4,088	1932-34		000
		1935	100	800
273	1,356	1936	221	1,596
	Tons 200 584 273	Tons Value \$ 200 1,400 584 4,088 273 1,356	Tons Value Years \$200 1,400 1931 1932 584 4,088 1932-34 1935 273 1,356 1936 1936	Tons Value Years Tons 200 1,400 1931 117 584 4,088 1932-34 1935 100 273 1,356 1936 221

Table 18 - PRODUCTION OF MANGANESE ORE IN CANADA, 1923 - 1936.

"Metal and Mineral Markets" - New York - quoted (November, 1937) manganese ore - per long ton unit of Mn., c.i.f. North Atlantic ports, cargo lots exclusive of duty: Brazilian, 46 to 48 per cent Mn., nominal; Chilean, 47 per cent minimum, nominal; Indian 50 to 52 per cent, 45 cents; South African, 50 to 52 per cent, 45 cents. United States manganiferous ore, 10 per cent Mn,, 35 to 40 per cent Fe. 22 cents per unit for manganese content and 5 cents per unit of iron, per long ton, delivered at Birmingham.

Table 19 - CONSUMPTION OF MANGANIFEROUS ORE and MANGANESE COMPOUNDS in SPECIFIED CANADIAN INDUSTRIES, 1935 and 1936.

		1 9 3	5	19	3 6
Industry	Item	Quantity	Value	Quantity	Value
		Pounds	\$	Pounds	\$
Electrical Apparatus					
and Supplies	Manganese oxide	3,484,351	60,333	(a)	(乱)
Paints, Pigments and					
Varnishes	Manganese salts	90,042	13,913	236,162	16,573
Steel Ingots and					
Castings	Ore manganiferous				
	(foreign)	927,360	6,632	356,160	2,276

(a) Data not yet complete.

NOTE - In addition to the consumption recorded in the table above, a considerable quantity of manganiferous ore is employed in the manufacture of ferro-alloys.

Table 20 -	WORLD'S	PRODUCTION	OF	MANGANESE	ORE.	1933.	1934	and	1935.
		TIMPOOTTON		TIPE PTA / VENTATING TO	the same of the		and the state of the	solution with the state of	

(From	the Imperial Institute of the British Empir (Lon	e and Foreign e and Foreign g tons)	n - The Mineral Countries)	Industry of
Producing Country		1933	1934	1935

BRITISH EMPIRE			
Gold Coast	(c)265,104	365,178	430,659
Northern Rhodesia	5,367	2,041	3,976
Union of South Africa	20,894	64,463	93,943

Table 20 - WORLD'S PRODUCTION OF MANGAN	ong tons)	1934 and 193	55. (continued)
Producing Country	1933	1934	1935
BRITISH EMPIRE (concluded)			
Canada			89
India	218,307	406,306	641,483
Unfederated Malay States	13,193	18,876	28,054
Australia	149	105	148
Total	520,000	840,000	1,200,000
FORFIGN COUNTRIES			
Austria (b)	(a)	(a)	(a)
Czechoslovakia	16,799	58,433	70,306
Germany	554	507	220
Greece	1,578	1,187	416
Hungary	6,134	10	6,192
Italy	4,453	6,831	8,983
Portugal	25	290	156
Roumania	2,730	11,867	19,343
Spain	2,789	3,736	1,240
Sweden	6,124	6,212	7,114
U.S.S.R. (Russia)	982,000	1,792,000	2,340,000
Yugoslavia	521	1,086	913
Egypt	184	944	85,924
Morocco (French zone)	4,752	7,161	25,261
Cuba (d)	89,224	267,115	90,650
Porto Rico (exports)	1,638	1,711	3,358
Mexico	564	654	3,166
United States (e)	19,146	26,514	26,428
Argentina	404	574	432
Brazil (exports)	24,500	2,264	59,711
Chile	753	4,000	4,300
China	9,350	1,899	1,000
Japan	42,847	56,262	10,521
"Manchoukuo"	740	700	(8)
Netherlands East Indies	10,298	11,451	12,158
Portuguese India	1,600	3,800	4,000
Turkey	7,600	13	15,350
French Indo China	000	0.100.000	1,545
Total	1,240,000	2,100,000	2,800,000
WORLD'S TOTAL	1,760,000	3,000,000	4,000,000

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(a) Information not available.

(b) Manganese content of manganese ore and manganiferous iron ore.

(c) Exports.

(d) Low grade ore before concentration.

(e) Shipments. Excluding the following quantities of ore containing 10 to 35 per cent Mn, which is recorded by the United States Bureau of Mines as iron ore:-

1933	 . 12,779	long tons
1934	 . 23,231	11 11
1935	 . 93,291	11 EL

-20-MERCURY

There has been no Canadian production of new mercury reported since Previous to this a small output of quicksilver was recorded as having 1897. been produced in British Columbia from a property situated on the north shore of Kamloops lake. Cinnabar occurs on the property of the Manitou Mining Co. Ltd. located in the Mud Creek area of the Lillooet mining division in British Columbua: the mineral is found here in sheared greenstone or in massive amygdaloidal greenstone. This property has been reported as active since April 1st, 1936, and it was stated in the press in 1937 that the commercial production of mercury ores in British Columbia was a possibility in the near future.

Imports of quicksilver into Canada during 1936 totalled 78,781 pounds valued at \$66,511 compared with 121,741 pounds worth \$98,871 in 1935. Of the 1936 imports, 37,586 pounds at \$37,405 came from the United States and 30,795 pounds worth \$20,896 from Spain.

"Metal and Mineral Markets" - New York - quoted quicksilver (November, 1937) - per flask of 76 pounds, \$83 to \$85.

Table 21 - MERCURY CONSUMED IN SPECIFIED CANADIAN INDUSTRIES, 1935 and 1936.

	1 9	3 5	1 9	3 6	
Industry	Pounds	Value	Pounds	Value	
		\$		\$	
Boiler Compounds	770	689	1,050	970	
Medicinal and Pharmaceutical Preparations	25,826	18,524	(a)	(a)	
Other chemicals	78,080	57,093	(a)	(a)	

(a) Data not yet complete.

NOTE - In addition to the consumption specified, there is a considerable quantity of quicksilver employed in the recovery of both placer and lode gold.

Table 22 - WORLD'S PRODUCTION OF QUICKSILVER, 1933, 1934 and 1935.

(Taken	from	the Imper	rial Inst	titute's	publicati	on – Th	ie Mineral	Industry
0.	f the	British	Empire a	and Forei	ign Countr	ies)		
			(Th)		0			

1933	1934	1935
47	167	1,299
7,500	3,852	563
440		000
14,872	58,052	152,379
(a)	(a)	8,800
1.338.058	972,238	2,142,893
600	139	28
1.491.601	2.416.729	2.702.500
510.000	590.000	(a)
340.372	348.161	477.063
734.844	1.173.820	1.331.368
(c)62,100	(c) 50, 384	32,040
17.807	14,930	11.219
(a)	(á)	306
1,748	3,192	1,929
	1 9 3 3 47 7,500 440 14,872 (a) 1,338,058 600 1,491,601 510,000 340,372 734,844 (c)62,100 17,807 (a) 1,748 weight inclu	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

(a) informa

MOLYBDENITE

Molybdenite is the principal ore from which the metal molybdenum is reduced. It usually occurs in pegmatite dykes and on the contacts of limestone and gneiss. Molybdenum is employed chiefly for the manufacture of special alloy steels, the characteristics of which include their power to withstand high temperatures and pressures, corrosion and fatigue. The United States has produced 75 to 90 per cent of the world's supply of new molybdenum during recent years; the relatively small quantities produced in other countries come largely from Mexico and Norway; Chosen, Morocco, Peru and Australia are other producers.

The first commercial shipments of Canadian molybdenite concentrates since 1951 were made during the first six months of 1937. These totalled approximately five tons and were produced by the Phoenix Molybdenite Corporation, Ltd., the property of this company is located in Bagot township, Renfrew county, Ontario, and the production reported in 1937 was exported for treatment to foreign smelters. In 1936, considerable development work was conducted on the "Bain" molybdenite mine located in Masham township, Hull county, Quebec. Near Clinton, British Columbia, the Consolidated Mining and Smelting Company of Canada, Limited, completed a small amount of development work on its Timothy Mountain molybdenite property but no shipments were reported during the year under review.

Imports of calcium molybdate when imported by Canadian manufacturers of steel for use exclusively in the manufacture of steel, in their own factories, totalled 158,621 pounds valued at \$60,363 in 1936 compared with 74,994 pounds at \$26,192 in 1935; imports during both years came entirely from the United States.

Molybdenum ore was quoted in the United States (November, 1937) per pound of contained Mo S₂, nominally 42 cents for 90 per cent concentrate. London, per long ton unit, nominal at 47s. for 90 per cent concentrate.

	Ores treated	Ores and trates s	l concen-	MoSg con- tent of shipments
	Tons	Tons	Value(a)	Pounds
19251926	2,779 4,490	15.3 12.6	11,176 10,472	22,550 20,943
1927 1928 1929	2.900	••• •••	6.400	16 150
1930 1931 1932-1936 .(x)	12	0.61	280	1,222
1932-1936 .(x)	000		500	000

Table 23 -, PRODUCTION OF MOLYBDENITE IN CANADA, 1925 - 1936.

(a) Value as given by the operators,

(x) It was reported that 200 tons of surface ore were milled during 1934 at a molybdenite property in Renfrew county, Ontario; no shipments were reported. Some 5 short tons of molybdenite concentrates were shipped from the Phoenix mine, Renfrew county, during the first half of 1937.

(Taken from the Imperial I of the British	nstitute's publica Empire and Foreign (Cwt.)	ation - The Countries)	Mineral Industry
Producing Country	1933	1934	1935
BRITISH EMPIRE Australia	208	89	212
FOREIGN COUNTRIES Roumania (Bi-Mo Ore)	000	000	280
Yugoslavia Norway (MoS2 content)	8,149 3,700	4,793	363 12,736 3,230
Mexico	1,303 84,554	15,315 139,315	22,528 171,310
Peru (MoS ₂ content) China (MoS ₂ content)	198 21	172 22	194 (a)
Korea	2,070	2,037	2,077

(a) Information not available.

RADIUM-URANIUM

Commercial production of radium-uranium bearing ores in Canada comes at the present time entirely from the Great Bear Lake district in the Northwest Territories. Eldorado Gold Mines Ltd. operates a mine and mill at Echo Bay, Great Bear Lake, Northwest Territories, and was the only Canadian producer of pitchblende ores during 1936. Pitchblende concentrates produced by this company are treated for the recovery of radium and uranium at a refinery owned and operated by the company at Port Hope, Ontario. Important quantities of silver also occur with the pitchblende at the Eldorado mine and this metal, in the form of silver concentrates, is principally shipped to the metallurgical works of other firms for the recovery of the silver content.

During 1936 the Eldorado mill treated 22,946.7 tons of ore; from this tannage the Wilfley, Plat O, Jig, flotation concentrates and cobbed ore produced totalled 401.5 tons with a gross value of \$1,349,388. Production in 1935 was 296 tons valued at \$752,918. For the year ending December 31, 1935, ore reserves were developed to the extent of 17,366 tons. In 1936 the radium production at the Port Hope refinery was at the approximate rate of $2\frac{1}{2}$ grams per month and it was decided to increase the capacity of the refinery to three times the present size. Uranium, which is produced in important quantities at Port Hope from the pitchblende, is widely used in the ceramic industry for the colouring of glass, pottery and enamelware and for obtaining a satisfactory glaze.

The property of the Consolidated Mining and Smelting Company of Canada, Limited, which adjoins the Eldorado mine, was closed down in June. In Ontario, Canadian Radium Mines continued development during the year on their property at Cheddar, near Wilberforce, in northern Hastings county; pegmatite dykes at this property are stated to carry unspecified radioactive minerals; no commercial production was reported by this company.

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Table 24 - WORLD'S PRODUCTION OF MOLYBDENUM ORE, 1933, 1934 and 1935.

For statistical purposes, the data relating to the mining and milling and the refining of pitchblende-silver ores in Canada are combined, respectively, with those of silver-lead-zinc mining and non-ferrous smelting industries. Figures pertaining to production of radium and uranium in Canada are not published.

Imports into Canada of radium were valued at \$109,032 in 1936 compared with \$150,643 in 1935; statistics relating to imports and exports of uranium or uranium products are not published separately.

Radium was quoted in the United States (November, 1937) per Mg. radium content, \$40.

Table 25 - WORLD'S PRODUCTION OF URANIUM MINERALS, 1933, 1934 and 1935. (Taken from the Imperial Institute's publication - The Mineral Industry of the British Empire and Foreign Countries) (Cwt.)								
Producing Country	1933	1934	1935					
BRITISH EMPIRE Canada	(Ъ)	(ъ)	(d)					
Czechoslovakia (U ₃ 0 ₈) Portugal Belgian Congo United States (U ₃ 0 ₈)	236 1,233 (c) 18	236 7 91 (c) 70	311 117 (c) 232					

Uranium minerals are also produced in Russia.

(b) During 1933 and 1934, 5,021 mgrms. and 3,000 mgrms. of radium of 98 per cent. average concentration and 34,940 lb. and 27,000 lb. of uranium salts were produced, respectively.

(c) The output of uranium minerals is not available for these years but it is reported that the radium produced from these ores amounted to 6.7 grams in 1933. This production of radium represents the greater part of the world's supplies.

(d) In November, 1936, production of the first ounce of radium was completed.

SELENIUM

Selenium production in Canada represents a by-product in the electrolytic refining of blister copper made from Manitoba, Ontario and Quebec ores. It is recovered at Copper Cliff, Ontario, by the Ontario Refining Company, Ltd., and at Montreal East, Quebec, by the Canadian Copper Refiners, Ltd. Production during 1936 totalled 350,857 pounds valued at \$621,017 compared with 366,425 pounds worth \$703,536 in 1935. Of the 1936 output, 168,417 pounds were produced from Quebec ores, 106,300 pounds from Ontario nickel-copper ores, 50,760 pounds from the copper ores of that part of the Flin Flon mine located in Manitoba, and 25,380 pounds from that part of the same mine located on the Saskatchewan side of the interprovincial boundary.

One of the principal uses for selenium is in the manufacture of glass where it has widely replaced manganese for neutralizing color. It has been, or is, employed in the manufacture of television equipment and apparatus for making printed matter audible to the blind. It is also utilized in the

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fabricating of rubber, and the production of insecticides, paints, electrical rectifiers, catalysts, and ferroselenium for the steel industry.

General statistics on employment, etc., as relating to the production of both selenium and tellurium are included with those compiled for the Canadian non-ferrous smelting and refining industry. Figures pertaining to Canadian imports and exports of selenium are not published separately.

Selenium was quoted in the United States (November, 1937) - per pound, \$2 for black powdered, 99.5 per cent pure.

Years	Pounds	\$	Years	Pounds	\$
1932 . 1933 . 1934 .	48,221 104,924	70,345 171,311	1935 1936	366,425 350,857	703,536 621,017

Table 26 - PRODUCTION OF SELENIUM IN CANADA, 1932 - 1936.

SODIUM

According to the United States Bureau of Mines - "Sodium metal itself is far more important as regards tonnage made and used in the United States than are many better-known metals; volume for volume the world output of sodium exceeds that of nickel(1). Because it is so reactive chemically, sodium is used almost exclusively as a reducing agent in organic-chemical industries. United States production has been estimated at 8,000 to 10,000 tons annually for use mainly in making tetraethyl lead antiknock compounds and in making synthetic indigo. Prices are largely contractual; by January, 1929, the price had gradually receded to 15 cents a pound for contract shipments. A recent innovation is shipment in 40 ton tank cars." No Canadian imports of metallic sodium were recorded in 1936.

TELLURIUM

Production of tellurium in Canada during 1936 totalled 35,591 pounds valued at \$62,997 compared with 16,425 pounds at \$32,850 in 1935. According to origin of the ores, the output in 1936 was credited as follows - Quebec, 19,502 pounds; Ontario, 10,197 pounds; Manitoba, 3,928 pounds, and Saskatchewan, 1,964 pounds.

As with selenium, the metal was recovered in Canada as a by-product in the electrolytic refining of blister copper at Montreal East, Quebec, by Canadian Copper Refiners, Limited, and at Copper Cliff, Ontario, by the Ontario Refining Company, Limited. The production in Ontario represents the recovery of the metal solely from nickel-copper ores, whereas at Montreal East the metal originated in the copper-gold ores of the Flin Flon and Noranda mines of Manitoba-Saskatchewan and Quebec, respectively.

(1) Fink, C., G., Mining and Metallurgy, Vol. 18, No. 361, 1937).

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Tellurium has been employed in the purification of zinc solutions in electrolytic plants. It is used in the rubber industry for making latex and for increasing the abrasive resistance and toughness of certain rubber products. In the metal industries it is utilized for the hardening of lead and it is reported that it may also acquire importance in the steel industry.

Data relating to Canadian imports and exports of tellurium are not shown separately in the trade reports for the Dominion. Tellurium was quoted in the United States, November, 1937, at from \$1.75 to \$2.00 per pound.

DEODUCATION OF THE LUDITUM IN CANADA 1934 - 1936

Tear	Pounds	\$	Year	Pounds	\$
1934(x) 1935	5,130 16,425	25,599 32,850	1936	35,591	62 ,99 7

(x) First commercial production in Canada.

TIN

Tin is known to occur in the Snowflake and Sullivan mines in British Columbia and in certain pegmatites in southeastern Manitoba. It has also been reported at New Ross, Nova Scotia. No tin ore deposits have been worked or tin ore production recorded in Canada during recent years.

"The expansion of industry during 1936 and the prospect of greater expansion in the immediate future, due to the coincidence of rearmament programmes in many countries with a normal cyclical trade revival, have not been without their effect on the demand for tin. The tin consuming industries are among those which show the greatest expansion and consumption of tin in many directions is higher than ever before ... It is a matter of extreme importance, both now and for the future, to record that the International Tin agreement has been renewed for a further period of five years from January 1st, 1937. The new agreement is substantially the same in form as the old In the new agreement, standard tonnages for various signatory countries are laid down as follows -

Belgian	Co	ng	0		e 0	•			• •				•	13,200
Bolivia								0		0	-			46,490
French I	nd	0-	.Ch	i	na	,		0		- 10		0		3,000
Malaya .			• •			0				0				71,940
Vetherla	nd	s	Ee	S	t	I	nd	i	es	3		0	4	36,330
Vigeria	00	00		0		•	• •	0			0			10,890
Siam		-		+		0								18,000
TOTA	L			3	0 0				• •				-	199,850

"During 1936, world apparent consumption of tin amounted to 157,182 tons, the highest figure for any year since 1930. Production for the year totalled 171,888 tons of which 90.8 per cent came from countries participating in the control agreement." (The Tin Producers' Association - London).

The average price for Straits tin - New York, 1936, was 46.441 cents per pound; the average price for the same tin in London was 204.445 pounds sterling per long ton.

Table	28	 IMPORTS	OF	TIN	INTO	CANAD	A, 1	935	and	19	36.	
and the second s								7	0	Z	E	

T 3	5 5	T 3 9 0		
Pounds	\$	Pounds	\$	
4,677,000	2,323,177	4,846,800	2,182,419	
45,245	44,335	00,000	63,829	
628,399 222,388	167,922 92,822	185,579 219,405	46,644	
819,164	213,812	934,381	240,272	
	190,135 300,819	000	201,679 383,981	
161,551,500	7,889,168	188,611,300	9,184,222	
	Pounds 4,677,000 45,245 628,399 222,388 819,164 161,551,500	1 9 5 5 Pounds \$ 4,677,000 2,323,177 45,245 19,756 44,335 628,399 167,922 222,588 92,822 819,164 213,812 190,135 300,819 161,551,500 7,889,168	I 9 5 I 9 Pounds Pounds Pounds 4,677,000 2,323,177 4,846,800 45,245 19,756 68,820 44,335 628,399 167,922 185,579 222,388 92,822 219,405 819,164 213,812 934,381 300,819 161,551,500 7,889,168 188,611,300	

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1 0 7

Table 29 - AVAILABLE STATISTICS ON THE CONSUMPTION OF TIN IN SPECIFIED CANADIAN MANUFACTURING INDUSTRIES, 1934 and 1935.

Industries	Items (used)	1934	1935
		Pounds	Pounds
Brass and copper products	(Ingots	261,354 91,939 5,038	254,132 26,954 33,681
White metal alloys	Pig	2,455,847	2,898,077
Products(x)	Tin	1,214,493	929,373
GRAND TOTAL		4,028,671	4,142,217

 (x) Includes castings and forgings; boilers, tanks and engines; farm implements; machinery; hardware and tools; sheet metal products; wire; railway rolling stock; heating and cooking apparatus; automobile parts, etc.
 NOTE - Data for 1936 not yet complete.

Table 30 - WORLD'S PRODUCTION OF TIN ORE IN TERMS OF METAL, 1929, 1935 and 1936. (From the Year Book of the American Bureau of Metal Statistics) (in tons of 2,240 lb.)

Country	1929	1935	1936
United States Bolivia Great Britain China Japan India (Burma) Indo-China Federated Malay States Unfederated Malaya Siam Netherland India Australia Nigeria Union of South Africa Belgian Congo Other countries (a)	35 46,337 3,271 6,778 789 2,649 861 67,040) 2,325) 10,517 34,952 2,239 10,734 1,200 (b) 2,273 192,000	40 27,168 2,050 9,500 2,100 4,102 1,310 45,955 9,779 24,632 3,130 7,029 612 6,118 3,100 146,625	100 24,074 2,125 10,500 2,400 4,270 1,380 66,806 12,678 31,546 3,000 9,529 633 7,280 3,300 179,621

For footnotes - see next page.

Footnotes to Table 30 -

- (a) Principally Spain, Portugal and African countries not separately reported, and Belgian Congo for 1929. Production of Mexico and Argentina is included. Production of tin began in Russia in 1934, but reliable data as to it are not yet available.
- (b) Included in "Other countries."

In this table accounting is mainly on the basis of exports. The figures for Bolivia, Netherland India, Malaya, Nigeria and Siam are as communicated through the International Tin Committee, and in 1935 include production for buffer stock.

TANTALUM

Tantalum metal is not produced in Canada, however, it is interesting to note that the Department of Mines and Resources, Ottawa, reports that columbite-tantalite has been found in small quantities in a number of feldspar mines in the Dominion.

Tantalum is malleable, ductile, tough, and has a high tensile strength; the metal is very resistant to chemical reagents.

The metal in the pure form finds employment in various shapes in the chemical and electrical industries while tantalum carbide is utilized for machine tools, drawing dies, etc.

Tantalum ore was quoted in the United States, November, 1937, at \$1.00 to \$2.50 per pound Ta₂O₃, for 60 per cent concentrates; the price depending on source of supply.

TITANIUM

Ilmenite, the titanium ore so largely employed in the manufacture of pigments, is known to occur at several places in Canada and commercial shipments of the mineral have been made during past years from deposits located at St. Urbain and Ivry in the province of Quebec. During 1936, Canadian production came entirely from St. Urbain, Quebec, and totalled 2,566 short tons valued at \$18,318; the mineral was consigned to firms manufacturing ferroalloys and electrical equipment and supplies.

Titanium metal itself has practically no commercial use, however, the element is consumed in increasing quantities in the manufacture of steel, various non-ferrous alloys and castings. It is also employed very largely in the production of titanium pigments. Titanium dioxide in the form of mineral rutile is used in considerable quantities for the making of welding rods and ceramic glasses and to increase fluidity of acid-resisting enamels. In this regard it is interesting to note that rutile occurs in the ilmenite deposits of the St. Urbain area, Quebec.

Imports into Canada of antimony oxide, titanium oxide and white pigments containing not less than 14 per cent by weight of titanium totalled 4,198,017 pounds valued at \$424,451 in 1936 compared with 2,870,491 pounds at \$310,033 in 1935. Of the 1936 imports, 1,991,527 pounds valued at \$220,927 came from the United Kingdom and 2,172,290 pounds worth \$199,606 from the United States. United States quotations for titanium ore (November, 1937) were per gross ton, ilmenite, 45 to 52 per cent TiO2, f.o.b. Atlantic seaboard, \$10 to \$12, according to grade and impurities. Rutile, per pound, guaranteed minimum 94 per cent concentrate, 10 cents, nominal; 88 to 90 per cent, \$55 per ton, c.i.f. New York.

Table 31 - PRODUCTION OF TITANIUM ORE IN CANADA(x), 1927 - 1936.

Years	short tons	\$	Years	short tons	\$
1927 1928 1929 1930 1931	2,029 2,244 2,748 412 1,509	8,980 6,732 7,359 1,239 10,261	19 32 19 33 1934 19 35 19 36	2,023 2,288 2,566	14,161 16,400 18,318

(x) all from Quebec.

Table 32 - CONSUMPTION OF TITANIUM PIGMENTS IN CANADIAN PAINT INDUSTRY, 1931 -1936.

Years	Pounds	Cost at works	Years	Pounds	Cost at works	
Child States II		\$		and the second second	\$	
1931	745,207	89,761	1934	1,710,188	186,678	
1932	691,304	96,759	1935	2,513,026	261,506	
1933	1,061,249	128,969	1936	2,456,265	269,130	

<u>NOTE</u> - Neither titanium white nor titanium alloys are commercially produced in Canada.

Table 33 - WORLD'S PRODUCTION OF TITANIUM MINERALS, 1933, 1934 and 1935. (Taken from the Imperial Institute's publication - The Mineral Industry

of the British Empire and Foreign Countries) (Long tons)					
Producing Country and Description	1933	1934	1935		
BRITISH EMPIRE					
Canada (shipments) - Titaniferous iron ore		1,806	2,043		
Federated Malay States - Ilmenite	201	50	2,500		
India - Ilmenite	52,980	75,644	127,051		
Australia - Ilmenite	550	(b)	(b)		
FOREICN COUNTRIES					
Norway - Ilmenite	22,846	25,891	37,384		
Rutile	55	243	122		
Portugal - Ilmenite		434	260		
Cameroon (French)			44		
Egypt		161	180		
Senegal (exports) - Ilmenite	300	500	1.230		
Argentina - Titaniferous iron ore	2.600	1.000			
Brazil (exports) - Ilmenite and rutile	95	114	282		

NOTE - For FOOTNOTES to Table 33 - See next page.

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FOOTNOTES to Table 33 -

- NOTE Titanium minerals are also produced in the United States, but figures are not available for publication. In recent years, however, the production of ilmenite has varied between 1,000 and 5,000 tons, and the production of rutile has been several hundred tons.
- (b) Zircon-rutile-ilmenite concentrates are produced in New South Wales as follows -

1934 51 tons 1935 300 tons but amount of ilmenite or rutile recovered is not recorded.

TUNGSTEN

Several occurrences of tungsten-bearing minerals are known to occur in Canada but only comparatively small shipments of tungsten ores have been made, the last being recorded in 1912 and 1917.

At Indian Path, Lunenburg county, Nova Scotia, the Indian Path Mines Ltd., carried on further test work during 1936 in the shaft sunk in the western section of its tungsten property; a crosscut was driven for a short distance north and south of this shaft in order to determine the width of the "belt" at that point.

During 1936 considerable development work of an exploratory nature was conducted on a tungsten bearing deposit located on Hardscrabble Creek, Barkerville mining division, British Columbia. These operations were carried on by Columbia Tungstens Ltd., of New York.

The principal use for tungsten is in the manufacture of high-speed tool steels. It is also employed in certain non-ferrous alloys and special alloy steels. Tungsten carbide cemented with cobalt is used extensively in industry and recent developments include several special grades including combinations of tungsten carbide and tantalum carbide cemented with cobalt or nickel or both, also combinations of tungsten carbide and titanium carbide cemented with cobalt. Tungsten is also utilized in the making of lamp filaments, radio tube filaments and contact points in electrical apparatus; in the chemical industry it is employed in the manufacture of certain types of dyes (lakes), and mordants.

"Metal and Mineral Markets" - New York - quotations for Tungsten ore (November, 1937) were - per unit of WO3, N.Y.: Chinese Wolframite, \$22, duty paid, quotation nominal. Domestic scheelite, known good analysis, carload lots or more, \$21.50 to \$22. London: Chinese, 65 per cent WO3, 60s. to 70s. per unit. South American, 35 to 40 per cent grade, 45s.

Canadian imports of chromium metal and tungsten metal, in lumps, powder, etc., for alloying purposes totalled 140,834 pounds valued at \$60,382 in 1936 compared with 36,007 pounds worth \$22,454 in 1935. Imports in 1936 of metallic elements and tungstic acid for use only in the manufacture of electric lamp filaments were valued at \$86,239 in 1936 as against \$85,926 in 1935. -30-

Table	34	 TUNGSTEN	WIRE,	ETC.	, USE	D IN	MANU	IFACTU	RE OF	CANADIAN	ELECTRICAL
		1000	APPAR	ATUS	AND S	UPPL	IES,	1931	- 193	5.0	

Year Value \$	Year	Value \$	
1931 79,659 1932 53,802 1933 48,701	1934 1935	48,99 6	
Table 35 - WORLD'S PRODUCTION OF TUNG	STEN ORE AND CONCENTRA	ATES, 1933, 1934 a	and
(Taken from the Imperial In of the British En (Lon	nstitute's publication mpire and Foreign Coun ng tons)	n - The Mineral In ntries)	ndustry
Producing Country and Description	1933	1934 19	3 5
DDTUTCH MADTDE			
United Kingdom Concentrates	11	100	910
Nigeria - Concentrates		150	15
South West Africa - Wolfrem		17	42
Schoolite		±1	16
Southorn Rhodogia - Concentrates	30	106	21
Tengenvike Welfnem		100	64 5
Union of South Africe - Thingston and		* * *	0
India - Concentrates	•••• 2 1/7	3 3 2 2 2 3 3	837
Federated Malay States - Walfrom	22	20	8
Schoolito	019	1 508 1	365
Unfederated Malay States _ Wolfram	70	78	274
Australia - Walfram	17	339 (0	1
Schoolito	•••••	7	A
Now Zeeland - Concentrates		39	30
New Dealand - Concentration		00	00
FORETCH COUNTRIES			
Portugal - Concentrates	298	579 1	048
Tin_timesten ores	89	100	73
Snain - Concentrates	41	44 (0)
Mexico	••••••• 11	72	10
United States Concentrates	700	1 920 2	139
Argonting - Concentrates		1,025 k)	531
Boliste Concentrated	220	792 1	211
Pomi - Concentrates	06.3 06.3	10~ 10	52
China - Ore	5 608	6 205 (0)
French Indo_Ching _ Concentrates	202	979	377
Jenen - Schoolite	2003	61	88
Kones - One	150	363	862
Notherlands East Indias - Concentrates	TOO	2	2002
HOWER THE THE - CONCOUNT CON	000	~	~

Tungsten ores are also produced in U.S.S.R. (Russia)

(a) Information not available.

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 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.

It is interesting to note that vanadium is now being recovered from boiler and stack soot of ships burning Venezuela and Mexican oil for fuel. It is reported that this soot runs anywhere from 2 to 34 per cent V₂O₅.

Vanadium is consumed chiefly in the steel industry and more particularly in the manufacture of axles, springs, crankshafts and various automobile and locomotive parts. The addition of the metal to steel imparts tensile strength, elastic limit, yield point and impact strength. The salts are of considerable importance in chemical and other industries and the pentoxide has been employed as a catalyst.

Vanadium ore was quoted (November, 1937) by "Metal and Mineral Markets" - New York - per pound, V_2O_5 contained, $27\frac{1}{2}$ cents, f.o.b. shipping point. Ferro-vanadium - per pound of V contained, delivered, \$2.70 to \$2.90.

Possible imports of vanadium or vanadium compounds or alloys are not shown separately in Canadian trade reports.

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Table 36 - WORLD'S PRODUCTION OF VANADIO (Taken from the Imperial Inst of the British Empire (Long	itute's publ and Foreign tons)	Lication - The Countries)	Mineral Industry	7
Producing Country	1933	1934	1935	
BRITISH EMPIRE Northern Rhodesia (V content) South West Africa	35 177	3 324	170 1,570	
United States (V205)	3	(a)	(a)	

(a) Information not available

ZIRCONIUM

The metal is not produced in Canada; zircon is the most common zirconium mineral and the Department of Mines and Resources, Ottawa, states that it, or cyrtolite, commonly occurs in greater or less amount in Canadian Precambrian pegmatites, also in the pegmatitic apatite-phlogopite deposits of the Grenville areas in Ontario and Quebec. Brazil has been the chief source of commercial zirconium ore, greatly overshadowing all other occurrences in available reserves and cheapness of exploitation. The ore in Brazil has been called brazilite, -32-

apparently a mixture of baddeleyite and zirkelite.

According to the United States Bureau of Mines, the consumption of zirconium compounds has grown rapidly and until 1935 ore was imported into the United States almost exclusively from Brazil; in 1936 British India supplied 1,422 tons valued at \$29.35 per ton; Australia, 3,603 tons valued at \$15.35 per ton, and Brazil, 751 tons valued at \$23.95 per ton.

The United States Bureau of Mines also reports that zirconium-silicon and zirconium-ferrosilicon are developing a gradually growing use in steel making, as superscavengers of oxygen and sulphur for controlling grain size. The extraordinary increase in industrial importance of zirconium, however, is based upon the employment of its compounds in enamels and for electrodes or welding-rod coatings. A particularly interesting development is the new electrical heating element for stoves and furnaces made with granular and milled zircon.

Imports of zirconium silicate into Canada were valued at \$2,547 in 1936 while those of zirconium oxide, during the same year, totalled \$23,133.

"Metal and Mineral Markets" - New York - quoted (November, 1937) zircon ore - per ton, 55 per cent ZrO2, f.o.b. Atlantic seaboard, carload lots, \$55; 5 ton lots, \$60. Crude granular zircon, \$70, f.o.b. suspension bridge, N.Y.; milled, \$90.

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Table 37 - PRINCIPAL STATISTICS(x) OF THE MISCELLANEOUS METAL MINING INDUSTRY IN CANADA, 1935 and 1936.

	1935	1936
Number of firms	19	
Capital employed (a)	733,497	770,957
Number of employees - On salary	9 73	13
Total	82	113
Salaries and wages - Salaries	12,390 51.222	11,110
Total	63,612	142,974
Cost of fuel and electricity	32,147 4.051	33,492 8,894
Process supplies used	5,249	21,451
varue of hisomerrou (uer)	22,841	3,147

(x) Does not include data relating to smelters and refineries or to mining in the Northwest Territories.

(a) Exclusive of ore reserves,

Table 38 - AVERAGE NUMBER OF WAGE-EARNERS EMPLOYED, BY MONTHS, 1934 - 1936.

Months	1934	1935	1	1 9 3 6		
			Surface	Underground	Mi11	
Tampamy	12	19	ZA	10		
February	36	±~ 55	46	7		
March	34	73	48	17	600	
April	17	62	53	13	000	
May	25	51	49	14	000	
June	41	79	71	17	900	
July	42	80	114	30		
August	44	78	61	48		
September	62	83	76	55		
October	60	92	127	19	6	
November	45	86	78	49	10	
December	37	85	67	53	11	

Table 39 - POWER EQUIPMENT INSTALLED, 1936.

Description	Number	Horse power
Sterm engines	E	
Alectric motors	17	250
Gasoline engines	6 4	382 8
Boilers	3	155

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DIRECTORY OF FIRMS IN THE MISCELLANEOUS METAL MINING INDUSTRY IN CANADA, 1936.

Name of Firm and Product	Head Office Address	Location of Mine or Plant
Aluminum Company of Canada, Ltd. Product - Aluminium	340 University Ave., Toronto, Ont.	Arvida and Shaw- inigan Falls, P.Q.
Atlantic Manganese Corp. Ltd. (x) Product - Manganese ore	Box 486, Halifax, N.S.	New Ross, N.S.
Asbestos Corp. Ltd. Product - Chromite	Canada Cement Building Montreal, P.Q.	Thetford Mines, P.Q.
Baie St. Paul Titanic Iron Ore Co. Product - Titanium ore.	Baie St. Paul, P.Q.	St. Urbain, P.Q.
Bain, J., Estate of (x) Product - Molybdenite	c-o Toronto General Trusts Corp., Ottawa, Ont.	Hull Co., P.Q.
Canadian Beryllium Mines and Alloys Ltd. Products - Feldspar and Beryl (x)	901 Royal Bank Bldg., Toronto, Ont.	Quadeville, Ont.
Casey, Harry E. Product - Manganese ore	173 Weldon St., Moncton, N.B.	Turtle Creek, N.B.
Chromium Mining & Smelting Corp.Ltd., Product - Chromite and ferrochrome	Bank of Commerce Bldg., Hamilton, Ont.	Collins, Ont.
Canadian Pyrites Ltd.(x) Product - Titanium ore	c-o E. L. du Pont de Nemour & Co., Wilmington, Del., U.S	s St. Urbain, P.Q. 5.A.
Canadian Radium Mines Ltd. (x) Product - Radium ore.	288 Bay St., Toronto, Ont.	Haliburton Co.,Ont.
Columbia Tungstens Co., Ltd. (x) Product - Tungsten ore	61 Broadway, New York City, U.S.A.	Wells, B.C.
Consolidated Mining & Smelting Co. of Canada, Ltd. Products - Bismuth, Cadmium, Molybdenite (x)	C.P.R. Building, Montreal, P.Q.	Trail, B.C.
Canadian Copper Refiners Ltd. Products - Selenium, Tellurium	Royal Bank Bldg., Toronto, Ont.	Montreal East, P.Q.
Deloro Smelting & Refining Co.Ltd. Product - Bismuth	Deloro, Ont.	Deloro, Ont.
Eldorado Gold Mines, Ltd. Products - Radium-uranium salts and oxides, silver	Star Building, Toronto, Ont.	Great Bear Lake, N.W.T., and Port Hope, Ont.
El-Bonanza Mining Corp. Ltd. Products - Silver ore - pitchblende (x)	Star Building, Toronto, Ont.	Great Bear Lake, N.W.T.

-35-DIRECTORY OF FIRMS IN THE MISCELLANEOUS METAL MINING INDUSTRY IN CANADA, 1936. (concluded)

Name of Firm and Product	Head Office Address	Location of Mine or Plant
Harrison, E. Product - Manganese ore.	Elgin, N.B.	Gowland Mt., N.B.
Hudson Bay Mining & Smelting Co.Ltd. Product - Cadmium	Woodstock, Ont.	Flin Flon, Man.
Indian Path Mines, Ltd. (x) Product - Tungsten ore.	711 Dennis Bldg., Halifax, N.S.	Lunenburg Co., N.S.
Lithium Corp. of Canada, Ltd. (x) Product - Lithium ores.	403 Avenue Bldg., Winnipeg, Man.	Bernic Lake, Man.
Manitou Mining Co. Ltd.(x) Product - Quicksilver ore.	919 Stock Exchange Bldg., Vancouver, B.C.	Bridge River, B.C.
Ontario Refining Co. Ltd. Products - Selenium, Tellurium.	Copper Cliff, Ont.	Copper Cliff, Ont.
Phoenix Molybdenite Corp. Ltd. (x) Product - Molybdenite.	36 Toronto St., Toronto, Ont.	Renfrew Co., Ont.
Plante, P., & Bro. (x) Product - Chromite.	Ste. Angele de Merici, P.Q.	Arvantgish Tp.
Quebec Asbestos & Chrome Co. (x) Product - Chromite	31 W. 95th St.; New York City, U.S.A.	St. Cyr, P.Q.
(x) Active but not producing.		

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