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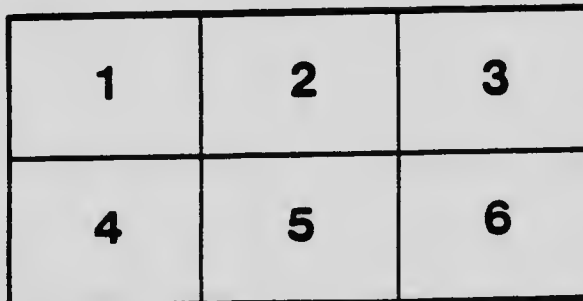
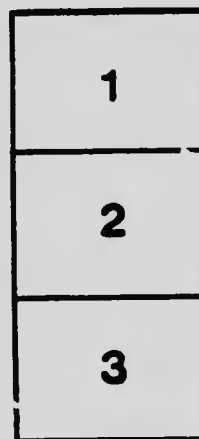
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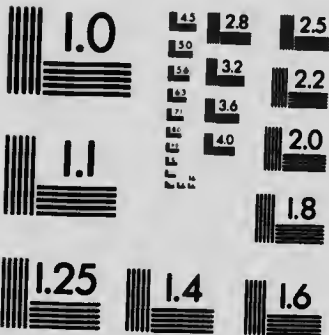
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CANADA

DEPARTMENT OF MINES

HON. LOUIS CODRAN, MINISTER; R. W. BROCK, M.A., DEPUTY MINISTER.

MINES BRANCH

EUGENE HAANEL, Ph.D., DIRECTOR.

THE

PRODUCTION OF COPPER, GOLD, LEAD, NICKEL, SILVER,
ZINC, AND OTHER METALS

IN

CANADA

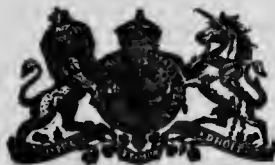
During the Calendar Year

1913

BY

COSMO T. CARTWRIGHT, B.Sc.

Assistant Mining Engineer, Division of Mineral Resources and Statistics.



OTTAWA.

GOVERNMENT PRINTING BUREAU

1914

No. 317.

DDN 8599141

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1914

65971—1

No. 317.

**ADVANCE CHAPTER OF THE ANNUAL REPORT ON THE
MINERAL PRODUCTION OF CANADA, DURING THE
CALENDAR YEAR 1913.**

*(Tons used throughout this report are short tons of 2,000 pounds, except
otherwise stated).*

00925364

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ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Slawenegan Falls, Quebec, from bauxite ores imported from France, Germany, and the United States by the Northern Aluminium Company. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm.

There being but one firm engaged in the manufacture of aluminium, we are precluded from publishing statistics of production.

Imports of alumina probably including bauxite, and exports of aluminium are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1913, the imports of alumina were 30,704,200 pounds, or 15,352 tons, while the exports of aluminium in ingots, bars, etc., during the same period, were 13,015,000 pounds, or 7,507 tons, besides manufactures of aluminium, valued at \$8,203.

The imports of alumina and exports of aluminium during the past nine years are shown in tabular form as follows:—

Annual Imports of 'Alumina' and Exports of Aluminium.

Calendar Year.	Imports of alumina.		EXPORTS OF ALUMINIUM.		
			Ingots, bars, etc.		Manufactures.
	Lbs.	Value. \$	Lbs.	Value. \$	Value. \$
1905	5,360,800	138,765	2,535,386	508,219	1,533
1906	8,975,400	239,136	4,521,486	899,113	2,211
1907	12,705,300	268,507	5,478,203	1,100,353	4,499
1908	1,485,500	29,752	1,713,800	399,785	1,727
1909	11,794,100	234,544	6,134,500	918,195	3,453
1910	19,464,400	403,283	7,722,400	1,160,342	3,741
1911	18,607,200	372,009	4,950,100	747,587	1,555
1912	22,400,500	448,061	18,285,700	902,303	10,898
1913	30,704,200	614,713	13,015,000	762,214	8,203

The price of aluminium, No. 1, ingots in New York varied between 27½ cents per pound in March and 18½ cents in December, the average for the year being 23·64 cents.

In Europe prices for aluminium for several years have been considerably lower than in the United States. In 1909 the prices per pound at works in Europe are reported by the Metallgesellschaft as having ranged from 13½ to 16 cents; in 1910, from 14 to 17½ cents; in 1911, from 11 to 13½ cents; and in 1912, from 13½ to 18½ cents.

ANTIMONY.

The production of antimony in Canada has been not only small, but spasmodic.

In 1907 the production was 2,016 tons of antimony ore shipped, valued at \$65,000, and 63,850 pounds of refined antimony, valued at \$5,108.

In 1908 customs returns showed an export of 148 tons of antimony ore, valued at \$5,443.

In 1909, in addition to the shipment of 35 tons of concentrates, there were produced about 61,200 pounds of antimony metal, chiefly at the works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, a small recovery being also reported from the Consolidated Mining and Smelting Company's refinery at Trail, B.C.

The total production of antimony in 1910, as reported to this Branch, consisted of 364 tons of antimony concentrates, valued at \$13,906, shipped from West Gore, Nova Scotia.

The auriferous antimony property at West Gore, formerly operated by the Dominion Antimony Company, Limited, was taken over in July, 1909, by the West Gore Antimony Company.

The mines and works of the Canadian Antimony Company, Limited, at Lake George, New Brunswick, have not been in operation since 1909.

In British Columbia, some of the lead ores contain a small percentage of antimony—about one-third of one per cent. Some refined antimony was recovered at Trail in 1907 and 1909, the recovery being somewhat irregular.

No production is reported in 1913.

Annual Shipments of Antimony Ore*.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886	665	31,490	1905 (a).....	527	.....
1887.....	584	10,860	1906 (a).....	782	.....
1888.....	345	3,696	1907*.....	2,016	65,000
1889.....	55	1,100	1908 (b).....	148	5,443
1890.....	26½	625	1909*.....	35	1,575
1891.....	10	60	1910.....	364	13,906
1892 to 1897.....	Nil.	Nil.	1911.....		
1898.....	1,344	20,000	1912.....		
1899 to 1904.....	Nil.	Nil.	1913.....		

(a) As recorded by the Nova Scotia Department of Mines; no value given.

(b) Exports.

*In addition to the shipments shown in the table, refined antimony was produced in 1907 to the extent of 63,850 pounds valued at \$5,108 and in 1909, 61,207 pounds valued at \$4,285.

Exports of Antimony Ore.

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1880.....	40	1,948	1899.....	61	190
1881.....	34	3,308	1900.....	210	3,441
1882.....	323	11,673	1901.....	10	1,643
1883.....	165	4,200	1902.....	90	13,658
1884.....	483	17,875	1903.....	33	4,332
1885.....	758	36,250	1904.....	160	7,237
1886.....	665	31,490	1905.....	525	27,118
1887.....	229	9,720	1906.....	420	17,064
1888.....	352}	6,894	1907.....	1,327	37,807
1889.....	30	695	1908.....	148	5,443
1890.....	38	1,000	1909.....	4	120
1891.....	3}	60	1910.....	239	14,095
1892 to 1897.....	Nil.	Nil.	1911.....	57	4,946
1898.....	1,232	15,295	1912.....	Nil.	Nil.
			1913.....	Nil.	Nil.

Imports of Antimony.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	42,247	5,903	1897.....	134,661	8,031
1881.....	.....	7,060	1898.....	156,451	12,350
1882.....	183,597	15,044	1899.....	289,066	16,851
1883.....	105,346	10,355	1900.....	186,997	20,001
1884.....	445,600	15,564	1901.....	350,737	24,714
1885.....	82,012	8,182	1902.....	504,822	39,276
1886.....	89,787	6,951	1903.....	868,146	65,434
1887.....	87,827	7,122	1904.....	418,943	27,112
1888.....	120,125	12,242	1905.....	186,454	12,828
1889.....	119,034	11,206	1906.....	403,918	56,297
1890.....	117,066	17,439	1907 (9 mos.).....	321,385	71,493
1891.....	114,084	17,483	1908.....	484,899	66,484
1892.....	180,308	17,680	1909.....	444,254	32,133
1893.....	181,823	14,771	1910.....	563,662	40,681
1894.....	139,571	12,249	1911.....	640,208	42,234
1895.....	79,707	6,131	1912.....	533,517	35,462
1896.....	163,209	9,557	1913.....	937,294	62,104
					\$
1913 {			Duty.		
Antimony, or regulus of, not ground, pulverized or			free.	881,155	54,832
otherwise manufactured.....			"	56,139	7,272
Antimony salts.....					
Total.....				937,294	62,104

COBALT.

The silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, in the Province of Ontario, are now the principal sources of the world's production of cobalt.

By the smelters they are regarded as silver ores and no allowance is made to the mine owners for cobalt contained therein. During the past year, however, the high-grade mill at the Nipissing mine has been shipping its residues high in cobalt and receiving payment therefor.

The recovery of this metal in Canada has been in the form of cobalt oxide and mixed oxides of cobalt and nickel, the smelters thus producing cobalt oxide being those of the Coniagas Reduction Company at Delor Thorold, Ont.; the Deloro Mining and Reduction Company at Deloro, Ont.; the Dominion Refineries, Limited, North Bay, Ont.; and the Meta Chemical Company at Welland. The Buffalo and Ontario Smelting Company at Kingston produced some mixed oxides. According to direct returns there were produced during 1913, 660,079 pounds of cobalt oxide, valued at \$525,028, and mixed oxides of cobalt and nickel, and cobalt bearing residues valued at \$90,266, as well as 268,304 pounds of nickel oxide valued at \$80,561.

In 1911 there were produced 154,174 pounds of cobalt and nickel oxides and 1,260,832 pounds of cobalt material and mixed cobalt and nickel oxides, the total value being \$221,690. In 1912 the production was cobalt oxide and nickel oxide, 349,454 pounds, valued at \$156,256, and cobalt material and mixed oxides, 1,285,280 pounds, valued at \$163,988.

No information is available as to the quantities recovered from ores shipped to smelters outside of Canada.

The following table shows the ore shipments, estimated cobalt content and value received by the shippers for cobalt, as published by the Ontario Bureau of Mines:—

Year.	Ores shipped.	Estimated total cobalt content.	Per cent.	Value received by shippers for cobalt.
	Tons.	Tons.		\$
1904.....				
1905.....	158	16	10-1	19,960
1906.....	2,144	118	5-5	100,000
1907.....	5,335	321	6-0	80,704
1908.....	14,788	739	5-0	104,426
1909.....	25,624	1,224	4-7	111,118
1910.....	30,677	1,533	5-0	94,965
1911.....	34,282	1,098	3-2	54,699
1912.....	26,653	852	3-2	170,890
1913.....	21,933	934	3-2	314,381
	20,877	821	3-2	420,386

The figures for the last four years for this table are based on the assumption that the ores and concentrates as shipped contain 3.20 per cent cobalt, but the values attached are those obtained by the refiners on the sale of the products as marketed.

Cobalt is not now quoted on the open market.

Some researches on cobalt and cobalt alloys were undertaken by Dr. H. T. Kalmus, at Queen's University, and a report has been issued.¹

In 1907 an Act was passed by the Ontario Legislature, authorizing the payment of bounties on certain nickel, cobalt, copper, and arsenic products, mined and refined in the Province. The Act and Amendment are quoted following:—

An Act to Encourage the Refining of Metals in Ontario.

Whereas, it is desirable to encourage the refining of nickel, cobalt, copper and arsenic ores within the Province;

Therefore His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. This Act may be cited as 'The Metal Refining Bounty Act.'

2. The treasurer of the Province may, under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant-Governor in Council, pay in each year to the refiners of the metals or metal compounds hereinafter specified, when refined in the Province from ores raised and mined in the Province, a bounty upon each pound of such metal or compound so refined as follows:—

Class 1.—On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel oxide; but nickel upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 2.—On refined metallic cobalt or on refined oxide of cobalt, 6 cents per pound on the free metallic cobalt or on the cobalt contained in the oxide of cobalt; but cobalt upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the amount to be paid as bounty on the cobalt products herein mentioned is not to exceed in all \$30,000 in any one year.

Class 3.—On refined metallic copper or on refined sulphate of copper, 1½ cents per pound on the free metallic copper or on the copper contained in the sulphate of copper; or on any copper product carrying at least 95 per cent of metallic copper, one-half cent per pound; but copper upon which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form; and the

¹Mines Branch No. 259 "Preparation of Metallic Cobalt by Reduction of the Oxide." Report on, by H. T. Kalmus, B. Sc., Ph. D.

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Value
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19,960
100,000
80,704
104,426
111,118
94,965
54,699
170,890
314,391
420,386

amount to be paid as bounty on the copper products herein mentioned is not to exceed in all \$60,000 in any one year.

Class 4.—On white arsenic, otherwise known as arsenious acid, produced from mispickel ores and not from ores carrying smaltite or niccolite or cobaltite, one-half cent per pound; but the amount to be paid as bounty on the arsenic compound herein mentioned is not to exceed in all \$15,000 in any one year.

(1) Provided, however, that if so much of any of the above-mentioned classes of refined products is refined in the Province in any one year that the amount hereby set apart in respect of the said class would be insufficient to pay the bounties herein provided therefor, then the bounty payable to the refiners of such class of refined products shall abate and be payable upon a *pro rata* basis so that not more than the maximum amount herein specified for any of the said classes shall be paid in respect of said class in any one year.

(2) Provided, also, that the bounties herein provided for shall cease and determine with the payment of any sum or sums which shall have been earned during the period of five years from the passing of this Act.

(3) No person, firm or company shall be entitled to claim or receive any of the bounties in this Act provided for unless such person, firm or company shall have been at all times prepared and ready and willing during the period for which the bounty is claimed, to smelt, treat and refine ores from which the same product as that on which the bounty is claimed can be produced, belonging to any other person, firm or company, at rate and on terms and conditions approved by the Lieutenant-Governor in Council, or shall have been ready to purchase such ores at rates approved by the Lieutenant-Governor in Council as current market rates.

An Act to Amend the Act to Encourage the Refining of Metals in Ontario.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

1. Subsection 2 of section 2 of The Metal Refining Bounty Act is amended by striking out the word 'five' where the same appears in the last line of the said subsection, and substituting therefor the word 'ten.'

COPPER.

The total production of copper in Canada in 1913, estimated on the basis of smelter recovery from ores treated, was 76,976,925 pounds, which, at the average price of copper for the year in New York, 15.269 cents per pound, would be worth \$11,753,606.

On a similar basis the production for 1912 was 77,832,127 pounds, valued at \$12,718,548, a falling off in quantity and owing to the decrease in the price of the metal, a still greater falling off in value.

In the case of British Columbia the metal is mainly derived from ores low in copper content and since in smelting the copper, losses are necessarily high, running as high in some cases as 25 per cent and over, the difference between the copper content of the ore as shipped by the mine, and the metal recovered from the ore at the smelter, is considerable.

Statistics of the copper production for the years previous to 1909 include for British Columbia a record of the copper production in that Province as collected by the Provincial Bureau of Mines. These are compiled on the basis of the total metal content of the ores received at the smelters, for which smelter returns were received during the year, and show a relatively higher copper production than the figures published for the Province of Ontario, which are based on copper content of matte produced.

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines in British Columbia provides for a deduction of five pounds of copper per ton of ore shipped on account of smelter losses, a method which gives a result closely approximating that obtained by this Branch.

Production of Copper by Provinces 1911, 1912 and 1913

Provinces.	1911.		1912.		1913.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Quebec.....	2,436,190	301,503	3,282,210	536,346	3,455,887	527,679
Ontario.....	17,932,263	2,219,297	22,250,601	3,635,971	25,885,929	3,952,522
British Columbia.....	35,279,558	4,366,198	50,526,656	8,256,561	45,791,579	6,991,916
Other districts*.....	‡	.....	1,772,660	289,670	1,843,530	281,489
Total.....	55,648,011	6,886,998	77,832,127	12,718,548	76,976,925	11,753,606

*Includes Nova Scotia and Yukon. ‡A shipment is reported from New Brunswick.

With the exception of a small output of copper sulphate at Trail B.C., the copper production of Canada is exported for refining. The exports of copper in ore, matte, regulus, etc., during the calendar year 1913 are reported by the Customs Department as 82,650,360 pounds, of which 77,323,592 pounds were exported to the United States, and 5,325,463 pounds to Great Britain, and 1,300 pounds to other countries.

The exports in 1912 were 78,488,564 pounds.

Prices.—The price of copper in New York varied between 17½ cents per pound at the beginning of January and 14 cents per pound in the middle of July.

The monthly average prices in cents per pound of electrolytic copper in New York are shown for a period of five years in the accompanying table:—

Monthly Average Prices of Electrolytic Copper in New York.

Months.	1909.	1910.	1911.	1912.	1913.
	Cts.	Cts.	Cts.	Cts.	Cts.
January.....	13-893	13-620	12-295	14-094	16-488
February.....	12-949	13-332	12-256	14-084	14-971
March.....	12-387	13-255	12-139	14-698	14-713
April.....	12-563	12-733	12-019	15-741	15-291
May.....	12-893	12-550	11-989	16-031	15-436
June.....	13-214	12-404	12-385	17-234	14-672
July.....	12-880	12-215	12-463	17-190	14-190
August.....	13-007	12-490	12-405	17-498	15-400
September.....	12-870	12-379	12-201	17-508	16-328
October.....	12-700	12-553	12-189	17-314	16-337
November.....	13-125	12-742	12-616	17-326	15-182
December.....	13-298	12-581	13-552	17-376	14-224
Yearly average.....	12-982	12-738	12-376	16-341	15-269

In London the monthly average prices of standard copper were as follows in pounds sterling per ton of 2,240 pounds:—

Monthly Average Prices of Standard Copper in London.

Months.	1909.	1910.	1911.	1912.	1913.
	£	£	£	£	£
January.....	57-688	60-923	55-601	62-760	71-741
February.....	61-197	59-388	54-000	62-893	65-519
March.....	56-231	59-214	54-704	65-884	65-329
April.....	57-363	57-233	54-035	70-294	68-111
May.....	59-338	56-313	54-313	72-352	68-807
June.....	59-627	55-310	56-368	78-259	67-140
July.....	58-556	54-194	56-670	76-636	64-156
August.....	59-393	55-733	56-264	78-762	69-200
September.....	59-021	55-207	55-253	78-762	73-125
October.....	57-551	56-722	55-176	76-389	73-383
November.....	58-917	57-634	57-253	76-890	68-275
December.....	59-906	56-069	62-063	75-516	65-223
Yearly average.....	58-732	57-054	55-973	72-942	68-335

Statistics showing the annual copper production of Canada since 1886 are given in the following table, which shows the yearly increase or decrease as the case may be and also the yearly price per pound in New York:—

Annual Production of Copper.

Calendar Year.	Lbs.	INCREASE OR DECREASE.		Value.	INCREASE OR DECREASE.		Average price per pound.
		Lbs.	%		\$	%	
				\$			Cts.
1886	3,505,000			385,550			11.00
1887	3,260,421	(d) 244,576	6.99	366,798	(d) 18,752	4.86	11.25
1888	5,562,804	2,302,440	70.60	927,107	560,309	152.70	16.66
1889	6,809,752	1,246,888	22.40	939,341	9,234	0.99	13.75
1890	6,013,671	(d) 796,081	11.69	917,153	10,812	1.15	15.75
1891	9,629,401	3,515,730	58.46	1,226,703	279,550	29.51	12.87
1892	7,087,275	2,442,126	25.63	818,580	(d) 408,133	33.27	11.55
1893	8,109,856	1,022,381	14.40	871,800	53,229	6.50	10.75
1894	7,708,789	(d) 401,067	4.94	736,960	(d) 134,849	15.46	9.56
1895	7,771,639	62,850	0.81	836,228	99,268	13.47	10.76
1896	9,393,012	1,621,373	20.86	1,021,960	185,732	22.21	10.88
1897	13,300,802	3,907,790	41.60	1,501,660	479,700	46.94	11.29
1898	17,747,136	4,446,331	33.43	2,131,980	633,320	42.17	12.03
1899	15,078,475	(d) 2,668,661	15.04	2,655,319	520,339	24.37	17.61
1900	18,637,138	3,558,665	25.59	3,065,922	410,603	15.46	16.19
1901	37,827,019	18,889,881	99.75	6,096,581	3,030,659	98.81	16.117
1902	38,804,259	977,240	2.58	4,511,383	(d) 1,585,198	26.00	11.626
1903	42,684,454	3,880,195	10.00	5,619,487	1,138,101	25.23	13.235
1904	41,883,722	(d) 1,300,732	3.05	5,306,635	(d) 312,852	6.07	12.823
1905	48,092,753	6,709,031	16.21	7,497,660	2,191,025	41.29	15.590
1906	55,609,888	7,517,135	15.63	10,720,474	3,222,814	42.98	19.278
1907	56,979,265	1,369,317	2.46	11,598,120	677,654	6.32	20.004
1908	63,702,873	6,723,668	11.80	8,413,876	2,981,214	26.18	13.208
1909*	52,493,863	977,240	2.58	6,814,751			12.982
1910	55,692,399	3,198,536	6.09	7,094,091	279,310	4.10	12.738
1911	55,648,011	(d) 44,358	0.79	6,886,998	(d) 207,096	2.92	12.376
1912	77,832,127	22,184,116	28.50	12,718,548	5,831,550	45.85	16.341
1913	76,976,925	(d) 855,202	1.10	11,753,606	(d) 964,912	7.59	15.269

*The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years. (See explanation in text).

Statistics of the exports of copper as collected by the Customs Department are shown in the table following, and statistics of imports in the two succeeding tables. The total imports of copper, in so far as weights are given, amounted, during the fiscal year ending March, 1913, to 44,649,566 pounds. During the calendar year 1913 the total imports were valued at \$7,414,610 and included crude and manufactured copper to the extent of 43,054,418 pounds, valued at \$7,044,297, together with other copper manufactures valued at \$370,312, of which the quantity is not stated.

In detail these imports comprise:—

	Pounds.	Value
Copper, (pigs, ingots, scrap, blocks, etc.).....	5,910,900	\$ 93
“ in bars, rods, coils, etc.....	29,387,900	4,88
“ in strips, sheets or plates.....	4,255,900	78
“ tubing, etc.....	884,920	20
“ wire.....	572,341	12
“ sulphate.....	2,037,714	10
“ crude precipitate.....	4,743	

Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value
		\$			
1885.....		262,600	1899.....	11,371,760	1,10
1886.....		249,259	1900.....	23,631,523	1,74
1887.....		137,966	1901.....	32,488,872	3,40
1888.....		257,260	1902.....	20,094,498	2,47
1889.....		168,457	1903.....	38,364,670	3,87
1890.....		398,497	1904.....	38,553,282	4,21
1891.....		348,104	1905.....	40,740,861	5,44
1892.....		277,632	1906.....	42,398,538	7,30
1893.....	4,792,201	269,160	1907.....	54,688,450	8,74
1894.....	1,625,380	91,917	1908.....	51,136,371	5,93
1895.....	3,742,352	236,965	1909.....	54,417,750	5,83
1896.....	5,462,052	281,070	1910.....	56,964,127	5,84
1897.....	14,022,610	850,336	1911.....	55,287,710	5,40
1898.....	11,572,381	840,243	1912.....	78,488,564	9,03
			1913.....	82,650,360	9,60

Copper:—Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value
		\$			\$
1880.....	31,900	2,130	1897.....	49,000	5
1881.....	9,800	1,157	1898.....	1,050,000	80
1882.....	20,200	1,984	1899.....	1,655,000	246
1883.....	124,500	20,273	1900.....	1,144,000	180
1884.....	40,200	3,180	1901.....	951,500	152
1885.....	28,600	2,016	1902.....	1,787,200	325
1886.....	82,000	0,969	1903.....	2,038,400	252
1887.....	40,100	2,507	1904.....	2,115,300	270
1888.....	32,300	2,322	1905.....	1,944,400	266
1889.....	32,300	3,288	1906.....	2,627,700	441
1890.....	112,200	11,521	1907 (9 mos.).....	2,610,600	520
1891.....	107,800	10,452	1908.....	3,612,400	650
1892.....	343,600	14,894	1909.....	2,732,300	383
1893.....	168,300	15,331	1910.....	4,690,700	017
1894.....	101,200	7,397	1911.....	5,023,700	641
1895.....	72,062	6,770	1912.....	5,542,000	699
1896.....	86,905	9,226	1913.....	5,690,700	929

1913 { Copper, old and scrap or in blocks.....	Duty free.	569,100	82
{ Copper in pigs or ingots.....	“	5,121,600	847
Total.....		5,690,700	929

Imports of Manufactures of Copper.

Valued at.
 \$ 932,885
 4,886,846
 782,974
 205,797
 127,320
 107,960
 515

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	123,061	1891.....	503,522	1902.....	1,281,522
1881.....	159,163	1892.....	422,870	1903.....	1,201,655
1882.....	220,235	1893.....	458,715	1904.....	1,191,610
1883.....	247,141	1894.....	175,404	1905.....	1,775,881
1884.....	134,534	1895.....	251,615	1906.....	2,660,303
1885.....	181,460	1896.....	285,220	1907 (9 mos.).....	2,545,600
1886.....	219,420	1897.....	264,587	1908.....	2,713,060
1887.....	325,305	1898.....	780,529	1909.....	2,086,205
1888.....	303,459	1899.....	551,586	1910.....	2,870,630
1889.....	402,216	1900.....	1,090,280	1911.....	3,742,940
1890.....	472,668	1901.....	951,045	1912.....	4,494,721
				1913.....	6,618,862

Value.
\$
766
523
872
498
676
282
861
538
450
371
750
127
710
564
360

	Duty.	Lbs.	Value.
Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured.....	Free.	30,573,300	5,103,844
Copper, in strips, sheets or plates, not polished or coated, etc.....	"	4,481,100	874,070
Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured.....	"	889,056	201,217
1913 Copper rollers, for use in calico printing.....	"		8,674
Copper and manufactures of—			
Nails, tacks, rivets and burrs or washers.....	30 %		4,600
Wire, plain, tinned or plated.....	15 "	466,802	105,515
Wire cloth, etc.....	25 "		7,239
All other manufactures of, n.o.p.....	30 "		313,703
Total.....			6,618,862

Value.
\$
5,449
80,000
246,740
180,990
152,274
325,832
252,594
270,315
266,548
441,854
520,971
650,597
383,441
617,630
641,749
699,442
929,668

Quebec.

The mines of the Eastern Townships were still more active during 1913 with an increased copper production therefrom. This amounted to 3,455,887 pounds, valued at \$527,679, representing the estimated recovery from 87,314 tons of ore and concentrates. Statistics of the copper production of Quebec province since 1886 are shown in the table following:—

82,274
847,394
929,668

Quebec:—Production of Copper.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886	3,340,000	367,400	1900	2,220,000	359,418
1887	2,937,900	330,514	1901	1,527,442	246,178
1888	5,562,864	927,107	1902	1,640,000	190,666
1889	5,315,000	730,813	1903	1,152,000	132,467
1890	4,710,306	741,920	1904	1,760,000	97,455
1891	5,401,704	695,499	1905	621,213	252,752
1892	4,883,480	504,012	1906	1,981,169	381,930
1893	4,468,352	480,318	1907	1,517,990	303,659
1894	2,176,430	208,067	1908	1,282,024	169,330
1895	2,242,462	241,283	1909	877,317	141,272
1896	2,407,200	261,903	1910	2,436,190	111,757
1897	2,474,970	279,424	1911	3,282,210	301,503
1898	2,100,235	252,658	1912	3,155,887	536,346
1899	1,632,560	287,494	1913		527,679

Ontario.

The copper production from Ontario comes mainly from the nickel-copper ores of Sudbury district.

The chief companies are: The Canadian Copper Co., Limited, shipping from the Creighton, Crean Hill, the No. 2 and the No. 3, or Frood mines; and the Mond Nickel Co., Limited, operating the Garson, Victoria No. 1, North Star and Worthington. The Alexo mine, near Porquis Junction, on the Timiskaming and Northern Ontario Railway, shipped a considerable tonnage of nickel copper ore to the Mond Nickel Company's smelter.

The British America Nickel Corporation did some development work at the Murray and Whistle mines, but made no production. During the year the Mond Nickel Company opened their new smelter at Coniston and closed the old plant at Victoria Mines.

The total tonnage of nickel-copper ores smelted in 1913 was 823,400 tons. There were produced during the year 47,150 tons of bessemer matte containing 12,938 tons of copper and 21,838 tons of nickel, the shipping value of the matte being approximately \$7,076,945. Details of the production of these ores are given more completely and in tabular form in the article on "Nickel" and also under "Smelter Production."

The feature of the year in this district was the large increase in known ore bodies as discovered by diamond drilling.

A few shipments were made of copper ore from Dane to United States smelters, and payments were made for a small amount of copper in shipments from the Cobalt district to American smelters.

The Ontario Government offers a bounty on copper over 95 per cent pure metal, and on copper-sulphate produced from ore mined and refined

the Province. The text of the Act will be found in the chapter on cobalt, under the heading "Metal Refining Bonnty Act."

Statistics of the copper production of Ontario since 1886 are given in the table following:—

Ontario:—Production of Copper.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886.....	165,000	18,150	1900.....	6,740,058	1,091,215
1887.....	322,524	36,284	1901.....	8,695,831	1,401,507
1888.....	Nil.	Nil.	1902.....	7,408,202	861,278
1889.....	1,406,752	201,678	1903.....	7,172,531	949,285
1890.....	1,303,085	205,233	1904.....	4,913,591	630,070
1891.....	4,127,697	531,234	1905.....	8,779,259	1,368,686
1892.....	2,203,795	251,538	1906.....	10,638,231	2,050,838
1893.....	3,641,507	391,461	1907.....	14,104,337	2,821,432
1894.....	5,207,679	497,854	1908.....	15,005,171	1,981,883
1895.....	4,576,337	492,414	1909.....	15,746,699	2,014,237
1896.....	3,167,256	344,598	1910.....	19,259,016	2,453,213
1897.....	5,500,652	621,023	1911.....	17,932,263	2,219,297
1898.....	8,375,223	1,007,539	1912.....	22,250,601	3,035,971
1899.....	5,723,324	1,007,877	1913.....	25,885,929	3,952,522

British Columbia.

According to returns received from the smelters, the total quantity of copper contained in matte, blister, and copper-sulphate produced in British Columbia smelters during 1913, and including an estimate of smelter recovery for copper ores exported, was 45,791,579 pounds, after deducting the amount of copper produced from foreign ores. The production of 1912 on a similar basis was 50,526,656 pounds, and in 1911, 35,279,558 pounds.

Returns of smelter production in this Province were not collected by this Department previous to 1908, and a complete record of statistics of production on this basis is not available.

The production of copper in this Province, according to statistics collected and published by the Provincial Department of Mines, reached a total of 46,460,305 pounds in 1913, as compared with 51,546,537 pounds in 1912. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, and the production by districts since 1908 are shown in the tables following:—

British Columbia:—Copper Content of Ores Shipped.†

Calendar Year.	COPPER CON- TAINED IN ORES SHIPPED.		INCREASE.		Value.
	Lbs.	Lbs.	%		
1894.....	324,680				\$ 31,03
1895.....	932,840	628,160	193.00		102,52
1896.....	3,818,556	2,885,716	301.00		418,45
1897.....	5,325,180	1,506,624	30.00		601,21
1898.....	7,271,678	1,946,498	36.00		874,78
1899.....	7,722,801	450,913	6.00		1,359,94
1900.....	9,977,080	2,254,480	29.00		1,615,29
1901.....	27,603,746	17,626,666	177.00		4,448,86
1902.....	29,636,037	2,032,311	7.00		4,448,86
1903.....	34,350,921	4,723,864	16.00		4,847,73
1904.....	35,710,128	1,350,207	3.7		4,879,1
1905.....	37,092,251	1,982,123	5.6		5,876,2
1906.....	42,990,488	5,298,237	14.1		8,287,7
1907.....	40,832,720	*2,157,768	*5.02		8,168,1
1908.....	47,274,614	6,441,894	15.8		6,244,0
1909.....	45,597,245	*1,677,369	*3.6		5,918,5
1910.....	38,243,934				4,871,6
1911.....	36,927,656	*1,316,278	*3.4		4,571,6
1912.....	51,546,537	14,618,881	39.6		8,408,3
1913.....	46,460,305	*4,996,232	9.7		7,094,4

*Decrease. †As published by British Columbia Bureau of Mines. ‡Allowing 5 pounds of copper per ton of ore for smelter losses.

British Columbia:—Production of Copper by Districts.*

	1908.	1909.	1910 †	1911 †	1912 †	1913
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cariboo.....				19,151	88,403	
Cassiar.....	490,873	137,651				
West Kootenay—					26,257	813
Nelson.....	53,243	186,572	231,936			2,538
Trail creek.....	5,042,244	3,509,909	3,577,745	3,429,702	2,539,900	
Yale—						
Boundary.....	40,178,521	40,603,012	31,354,985	22,327,359	33,372,199	28,62
Ashcroft.....			1,178	152,723		3
Kamloops.....	3,269					
Coast districts.....	1,506,464	1,160,071	3,078,090	10,998,721	15,429,778	14,44
Total.....	47,274,614	45,597,245	38,243,934	36,927,656	51,456,537	46,46

*Copper content of ores shipped. †After deducting five pounds of copper per ton of slag losses.

According to direct returns in 1913, the ores of the Boundary district produced about 63.5 per cent of the total, the Rossland mines about 4.9 per cent, and the Coast district 29.8 per cent.

In the Boundary the production was mainly from the mines of three of the large smelting companies: the Granby Consolidated Mining, Smelting and Power Co., Limited; the British Columbia Copper Co., Limited, and the New Dominion Copper Co., Limited. The two first named operate their own smelters and convert their matte to blister copper. The low grade ores of this district are self-fluxing and very uniform in character, averaging a little over 1 per cent in copper, and from \$1 to \$2 in gold and silver.

The chief producing mines of the district were the Granby mines at Phoenix, the Mother Lode of the British Columbia Copper Company at Deadwood, and the Rawhide, of the New Dominion Copper Company, near Phoenix.

The British Columbia Copper Company have been steadily developing their properties at Princess Camp in the Similkameen, employing a large number of men.

Next in importance in point of production came the Coast district, with heavy shipments from the Britannia mines on Howe sound and the Marble Bay mine on Texada island. Several new properties were opened up at various points on the coast and active development was continued by the Granby Consolidated Mining, Smelting and Power Co., Limited, at their Hidden Creek property on Observatory inlet.

In the interior the main shippers at Rossland were the Centre Star, Le Roi groups, owned by the Consolidated Mining and Smelting Co., and the Le Roi II (Josie) mine. Besides these, shipments were made from the Nelson district by the Queen Victoria mine of the British Columbia Copper Co., and the Silver King of the Consolidated Mining and Smelting Co. A considerable amount of work was done on mines in the northern interior in the neighbourhood of New Hazelton.

Yukon.

The main shipments from this Territory were from the Pueblo mine at Whitehorse, which shows an increased tonnage over 1912. Some smaller properties also shipped, and it is reported that the owners of the Pueblo are reopening the War Eagle in the same neighbourhood.

ed.†

Value.

\$	31,030
	102,526
	415,450
	601,213
	874,783
	1,350,948
	1,615,280
	4,448,896
	3,445,488
	4,847,735
	4,879,110
	5,876,222
	8,287,706
	8,168,177
	6,244,031
	5,918,522
	7,871,812
	4,571,644
	2,408,513
	7,004,480

owing 5 pounds

istricts.*

	1913.
	Lbs.
	1,838
103	1,336
	815,126
257	2,538,661
900	
	28,621,973
199	37,578
.....	
	14,443,793
778	
	46,450,305
537	

per ton of ore for

ndary district
mines about

GOLD.

Refined Metal.—The Dominion Assay Office in Vancouver, operating in connexion with this Department, receives, assays, and purchases crude bullion, amalgam, nuggets, and dust, the resultant bullion being refined. The total quantity of bullion thus received during the twelve months ending December 31, 1913, was 109,907.74 ounces, being the weight after melting, valued at \$1,448,625.37, after deducting office charges.

The assay charge was removed January, 1913, leaving the melting charge, equivalent to one-eighth of one per cent of the value of the bullion, thus placing the charges on a par with those of American offices. The result has been an increase of nearly 50 per cent in the value of receipts, the value for 1912 being \$974,077.14 after melting.

A refinery is in operation at the Royal Mint at Ottawa and shipments of gold have been received from various provinces.

There is but one other refinery in Canada producing fine gold; that is, the Consolidated Mining and Smelting Co. of Canada, Limited, at Trail, B.C., where the gold is mainly recovered from the high grade silver-bearing ores and the "dry" ores shipped to the smelter. Its annual output is given below.

Production of Refined Gold at Trail, B.C.

Year.	
1904.....	.....
1905.....	.....
1906.....	.....
1907.....	.....
1908.....	.....
1909.....	.....
1910.....	.....
1911.....	.....
1912.....	.....
1913.....	.....

Mine Production.—The production of gold in Canada—made up of gold derived from alluvial workings, gold obtained from the crushing and free milling quartz ores, and gold obtained from ores and concentrates sent to copper and lead smelters, etc., reached a total in 1913, of 802,973 ounces, valued at \$16,598,923, as compared with 611,885 fine ounces valued at \$12,648,794, in 1912, and 473,159 fine ounces, valued at \$9,781,000 in 1911.

The production by provinces in 1911, 1912, and 1913, is shown in the table following:—

Production of Gold by Provinces, 1911, 1912, and 1913.

	1911.		1912.		1913.	
	Ozs. (fine †)	Value.	Ozs. (fine †)	Value.	Ozs. (fine †)	Value.
		\$		\$		\$
Nova Scotia.....	7,781	160,854	4,385	90,638	2,174	41,935
Quebec.....	613	12,672	642	13,270	701	14,491
Ontario.....	2,062	42,625	86,523	1,788,596	219,801	4,543,690
Alberta.....	10	207	73	1,599		
British Columbia....	(a) 238,496	4,930,145	251,815	5,205,485	297,459	6,119,027
Yukon.....	224,197	4,631,574	268,447	5,519,296	282,838	5,846,780
Totals.....	473,159	9,781,077	611,885	12,618,791	802,973	16,598,923

† Calculated from the value: one dollar = 0.048375 ozs.

	1911.	1912.	1913.
(a) As follows: Gold from placer mining.....	\$ 426,000	\$ 555,500	\$ 510,000
Gold from vein mining.....	4,504,145	4,619,985	5,639,027
	4,930,145	5,205,485	6,149,027

The exact value of fine gold is 32.19 dollars per ounce equivalent to \$20,671,834. (United States Standard.)

In most cases, statistics of gold production are stated as crude bullion with value thereof. The fine ounces given in the tables in this report are calculated from the values by multiplying these by 0.048375.

Of the total production in 1913, about \$6,346,072, or 38.2 per cent, is to be attributed to alluvial workings; \$5,185,544, or 31.2 per cent, was derived from stamp mill bullion, and \$5,067,307, or 30.6 per cent from ores sent to the smelters. Nova Scotia shows a decrease, and from Alberta no production is reported, but the other provinces all show increases, that for Ontario being most notable, due mainly to the increase from Porcupine district.

Ozs.
 4,336
 8,602
 9,993
 10,393
 15,346
 18,241
 13,298
 15,270
 12,118
 11,977

made up of
 the crushing of
 concentrates sent
 802,973 fine
 fine ounces.
 at \$9,781,077.

shown in the

Statistics of the annual gold production of Canada are shown in the following table:—

Annual Production of Gold in Canada, 1858-1913.

Calendar Year.	Ozs. (fine†)	Value.	Calendar Year.	Ozs. (fine†)	Value.
		\$			\$
1858.....	34,104	705,000	1886.....	70,782	1,465,400
1859.....	78,129	1,615,072	1887.....	57,460	1,187,000
1860.....	107,806	2,228,543	1888.....	53,145	1,098,000
1861.....	128,973	2,666,118	1889.....	62,653	1,292,000
1862.....	135,391	2,798,774	1890.....	55,620	1,144,000
1863.....	202,498	4,186,011	1891.....	45,018	930,000
1864.....	199,605	4,126,199	1892.....	43,905	907,000
1865.....	192,898	3,987,562	1893.....	47,243	976,000
1866.....	152,555	3,153,597	1894.....	54,000	1,128,000
1867.....	145,775	3,013,431	1895.....	100,798	2,082,000
1868.....	134,169	2,773,527	1896.....	133,262	2,754,000
1869.....	102,720	2,123,405	1897.....	291,557	6,028,000
1870.....	83,415	1,724,348	1898.....	666,386	13,774,000
1871.....	105,187	2,174,412	1899.....	1,028,529	21,264,000
1872.....	90,283	1,866,321	1900.....	1,350,057	27,908,153
1873.....	74,346	1,536,871	1901.....	1,167,216	24,122,000
1874.....	97,856	2,022,862	1902.....	1,032,161	21,336,000
1875.....	130,300	2,693,533	1903.....	911,559	18,844,000
1876.....	97,729	2,020,233	1904.....	796,374	16,464,000
1877.....	94,304	1,949,444	1905.....	684,951	14,154,000
1878.....	74,420	1,538,394	1906.....	556,415	11,504,000
1879.....	76,547	1,582,358	1907.....	405,517	8,384,000
1880.....	63,121	1,304,824	1908.....	476,112	9,814,000
1881.....	63,524	1,313,153	1909.....	453,865	9,384,000
1882.....	60,288	1,246,268	1910.....	493,707	10,204,000
1883.....	53,853	1,113,246	1911.....	473,159	9,784,000
1884.....	51,202	1,058,439	1912.....	611,885	12,644,000
1885.....	55,575	1,148,829	1913.....	802,973	16,504,000

†Calculated from the value: one dollar = 0.048375.

Gold was first discovered in various provinces about 1858 and reached a maximum of over four million dollars in 1863. From that year it increased or less steadily decreased until 1892, when the production was valued at \$907,601, but the discovery of gold in the Yukon caused a rapid increase to a second high point of \$27,908,153 in 1900, from which it fell until 1903 and after a stationary period around the ten million mark, has increased rapidly since the discovery of the Porcupine mines in Ontario.

Nova Scotia.

The gold production of this Province in 1913, which is derived almost entirely from quartz ores, is estimated at 2,174 fine ounces, valued at \$44,935, and shows a further decrease from previous years.

The principal operators in 1913 were:—

Switzer Mining Co., Fifteenmile Stream

Stillwater Mining Co., Moose River.

Touquoy Gold Mining Co., Moose River.

J. R. McDonald, Moose River.
 M. J. Higgins, Moose River.
 Caribou Gold Mines, Limited, Caribou.
 Golden Group Mining Co., Montagu.
 Loon Brook Gold Mining Co., Montagu.
 Geo. J. Hiseler, Chezzetcook.
 Petpeswick Mining Co., Lake Catcha.
 Dominion Leasing Co., Tangier.
 Boston and Goldenville Gold Mining Co., Shier's Point.
 L. A. Munger, Harrigan Cove.
 Goldenville Mining Co., Goldenville.
 Stormont Mining Co., Goldboro'.
 Norman McMillan, Lawrencectown.
 Dr. C. C. Ellis, Millers Lake.
 Alex. Greenough, Oldham.
 H. M. Rogers, Clyburn Brook (Victoria county).

Statistics of the annual production since 1862: the production of gold by district during the twelve months ending September 30, 1913, as collected and published by the Provincial Mines Department; and the production from 1862 to 1913, by districts, according to the same authority, are shown in the tables following:—

Nova Scotia:—Annual Production of Gold.

Cal. Year.	Tons treated.	Ozs. (fine)	Value.	Yield of gold per ton	Cal. Year.	Tons treated.	Ozs. (fine)	Value.	Yield of gold per ton.
			\$	\$				\$	\$
1862...	6,473	6,863	141,871	21.91	1888	36,178	21,137	436,939	12.08
1863...	17,000	13,180	272,448	16.02	1889	39,160	24,673	510,673	13.02
1864...	21,431	18,883	390,349	18.21	1890	42,749	22,978	474,990	11.11
1865...	24,421	24,011	496,357	20.32	1891	36,351	21,841	451,503	12.42
1866...	32,157	23,776	491,491	15.28	1892	32,552	18,865	359,967	11.08
1867...	31,384	25,763	532,563	16.96	1893	42,354	18,436	344,695	8.99
1868...	32,259	19,377	400,555	12.41	1894	55,357	18,834	389,338	7.04
1869...	35,144	16,855	348,427	19.91	1895	60,600	21,919	453,119	7.47
1870...	30,824	18,740	387,392	12.56	1896	69,169	23,876	493,568	7.13
1871...	30,787	18,139	374,972	12.17	1897	73,192	27,195	562,165	7.68
1872...	17,089	12,352	255,349	14.91	1898	82,747	26,054	538,590	6.50
1873...	17,708	11,180	231,122	13.05	1899	112,226	29,876	617,604	5.50
1874...	13,844	8,623	178,244	12.87	1900	87,390	28,955	598,553	6.85
1875...	14,810	10,576	218,629	14.76	1901	91,948	26,450	546,963	5.32
1876...	15,490	11,300	233,585	15.08	1902	93,042	30,348	627,357	6.68
1877...	17,369	15,925	329,205	18.95	1903	103,856	25,533	527,806	5.08
1878...	17,989	11,864	245,253	13.63	1904	45,436	10,362	214,209	4.71
1879...	15,936	12,980	268,328	16.83	1905	57,774	13,707	283,353	4.90
1880...	13,997	12,472	257,823	18.42	1906	66,059	12,223	252,676	3.82
1881...	16,556	10,147	209,755	12.66	1907	58,550	13,675	282,686	4.82
1882...	21,081	13,307	275,000	13.04	1908	61,536	11,842	241,799	3.97
1883...	25,954	14,571	301,207	11.60	1909	56,790	10,193	210,711	3.71
1884...	25,186	15,168	313,554	12.44	1910	43,006	7,928	163,891	3.81
1885...	28,890	20,945	432,971	14.98	1911	18,328	7,781	160,854	8.78
1886...	29,010	22,008	455,564	15.70	1912	14,360	4,385	90,638	6.31
1887...	32,280	20,009	413,631	12.81	1913	7,324	2,174	44,935	6.13

Total fine ounces gold..... 890,293
 Total value..... \$15,401,071

**Nova Scotia:—District Details of Gold Production, Year Ending
September 30, 1913.**

District.	Tons crushed.	TOTAL YIELD OF GOLD			AVERAGE YIELD OF GOLD PER TON.		
		oz.	dwt.	grs.	oz.	dwt.	grs.
Beaver Dam.....	12	3	5	0	5	10	
Caribou.....	687	459	5	17	13	9	
Caribou (Moose River).....	325	86	0	0	5	7	
Cow Bay.....	4	2	0	0	10	0	
Fifteen Mile Brook.....	783	304	18	3	7	19	
Lake Catcha.....	1,185	353	10	9	5	23	
Millers Lake.....	15	6	15	0	9	0	
Montagu.....	99	18	16	3	3	19	
Oldham.....	255	162	6	0	12	18	
Pleasant River Barrens.....		7	17	0			
Renfrew.....	476	190	19	0	8	1	
Slier's point.....	563	82	19	0	2	23	
Stormont.....	20	8	6	0	8	7	
Tangier.....	2,900	677	15	14	4	16	
Totals.....	7,321	2,364	12	22	6	11	

Nova Scotia:—Production of Gold from 1862 to 1913.

District.	Tons crushed.	TOTAL YIELD OF GOLD.			AVERAGE YIELD OF GOLD PER TON.			Valued at \$19 per oz.
		oz.	dwt.	grs.	oz.	dwt.	grs.	
*Caribou and Moose River.....	221,030	60,741	8	12	5	12	1,154,083	
Montagu.....	29,622	42,191	19	9	1	8	801,643	
Oldham.....	58,990	67,505	8	22	1	2	1,282,600	
Renfrew.....	61,795	48,699	7	19	15	18	925,288	
Sherbrooke.....	300,213	153,090	1	4	10	5	2,908,711	
Stormont.....	525,257	120,558	4	13	4	14	2,290,600	
Tangier.....	67,012	28,908	11	9	8	15	549,263	
†Unicake.....	63,351	43,983	1	17	13	21	835,673	
Waverley.....	155,520	69,980	10	16	9	0	1,329,630	
‡Brookfield.....	93,527	38,709	2	2	8	7	735,473	
§Salmon River.....	118,819	41,852	5	20	7	1	795,191	
||Whiteburn.....	6,907	9,800	0	2	1	8	186,200	
¶Lake Catcha.....	30,822	27,822	0	18	18	1	528,611	
¶ Rawdon.....	12,189	9,606	5	10	15	18	182,511	
¶ Wine Harbour.....	77,396	34,992	15	11	9	1	661,860	
**Fifteenmile Stream.....	36,878	17,363	0	5	9	10	329,899	
¶ Malaga Barrens.....	22,926	20,305	12	6	17	17	385,800	
§ West Gore (from Stibnite ore).....	3,240	4,512	15	10	1	7	85,740	
Other districts.....	141,935	75,367	2	22	10	9	1,431,970	
Totals.....	2,030,438	915,989	14	11	9	0	17,403,800	

*From 1869. †From 1868. ‡from 1883. §from 1857. ¶from 1882. ¶from 1887. **from 1883. §from 1905.

Quebec.

No alluvial production is reported from Quebec in 1913, but there was an increased tonnage and accompanying increase in value of the gold produced from the pyritic mines of the Eastern Townships.

Quebec:—Annual Production of Gold.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1877.....	583	12,057	1896.....	115	3,000
1878.....	868	17,937	1897.....	44	900
1879.....	1,160	23,972	1898.....	295	6,089
1880.....	1,605	33,174	1899.....	238	4,916
1881.....	2,741	56,661	1900.....	Nil.	Nil.
1882.....	827	17,093	1901.....	115	3,000
1883.....	860	17,787	1902.....	391	8,073
1884.....	422	8,720	1903.....	180	3,712
1885.....	103	2,120	1904.....	110	2,900
1886.....	193	3,981	1905.....	191	3,910
1887.....	78	1,604	1906.....	165	3,412
1888.....	181	3,740	1907.....	Nil.	Nil.
1889.....	58	1,207	1908.....	Nil.	Nil.
1890.....	65	1,350	1909.....	193	3,990
1891.....	87	1,800	1910.....	124	2,565
1892.....	628	12,987	1911.....	613	12,672
1893.....	750	15,696	1912.....	612	13,270
1894.....	1,412	29,106	1913.....	701	14,491
1895.....	62	1,281			
				16,899	349,293

*Calculated from the value: one dollar=0.048375 ozs.

Ontario.

The feature of the year in Ontario's gold production is not merely the increase from the Porcupine district, but the fact that the past year's production exceeds the total of all other years since 1886. The principal producers in 1913 were:—

Canadian Exploration Co., Long Lake mine, Algoma district.

Northern Gold Reefs, Ltd., St. Anthony mine, Sturgeon lake, Rainy River district.

Redeemer Mining Co., New Find mine, Sturgeon lake, Rainy River district.

Elizabeth Gold Mining Co., Elizabeth mine, Steeprock lake, Rainy River district.

The Dome Mines Co., Ltd., Dome mine, Timiskaming district.

The Dome Lake Mines, Ltd., Dome Lake mine, Timiskaming district.

Hollinger Gold Mines, Ltd., Hollinger mine, Timiskaming district.

Acme Gold Mines, Acme mine, Timiskaming district.

Ending

D OF GOLD
N.

grs.

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1,431,975

17,403,804

1883, \$from

The McIntyre Porcupine Mines, Ltd., McIntyre mine, Timiskaming district.

The Porcupine Crown Mines, Ltd., Porcupine Crown mine, Timiskaming district.

Wm. C. Offer, *et al.*, Porphyry Hill mine, Timiskaming district.

Mines Leasing and Dev. Co., Rea mine, Timiskaming district.

Porcupine Three Nations Gold Mining Co., Ltd., Three Nations mine, Timiskaming district.

Lucky Cross Mines of Swastika, Ltd., Lucky Cross mine, Timiskaming district.

Swastika Mining Co., Ltd., Swastika mine, Timiskaming district.

Tough Oakes Gold Mines, Tough Oakes mine, Timiskaming district.

La Mine d'Or Huronia, Ltd., Huronia mine, Timiskaming district.

Statistics of the production of gold in Ontario since 187 are shown in the table following:—

Ontario:—Annual Production of Gold.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	327	6,760	1901.....	11,844	244,837
1888.....	Nil.	Nil.	1902.....	11,118	229,87
1889.....	Nil.	Nil.	1903.....	9,096	188,036
1890.....	Nil.	Nil.	1904.....	1,935	40,000
1891.....	97	2,000	1905.....	4,402	91,000
1892.....	344	7,118	1906.....	3,202	66,193
1893.....	708	14,637	1907.....	3,212	66,399
1894.....	1,917	39,624	1908.....	3,212	66,399
1895.....	3,015	62,320	1909.....	1,569	32,425
1896.....	5,563	115,000	1910.....	3,089	63,845
1897.....	9,157	189,294	1911.....	2,062	42,625
1898.....	12,863	265,889	1912.....	86,523	1,788,590
1899.....	20,394	421,591	1913.....	219,801	4,543,690
1900.....	14,391	297,495			
				429,841	8,885,595

*Calculated from the value: one dollar=0.048375 ozs.

The following notes are taken from the respective company's reports:

The Dome Mines Co., Limited.

Year ending March 31, 1914.

“Record of production for twelve months ending March 31, 1914.....	
Tons of ore milled.....	145,305
Total value of ore treated.....	\$1,274,598.5
Average value per ton.....	\$ 8.7
Bullion recovered by amalgamation.....	Ozs. 730,866.7
Bullion recovered by cyanidation.....	Ozs. 473,730.8

Per cent of value recovered by amalgamation.....	60.7
Per cent of value recovered by cyanidation.....	39.3
Total value recovered.....	\$1,204,597.64
Per cent of value recovered.....	94.51

Hollinger Gold Mines, Limited.

Year ending December 31, 1913.

	Hollinger.	Acme.	Total.
"Tons of ore milled.....	138,291	1,840	140,131
Average value per ton.....	\$18.56	\$12.49	
Total values sent to mill.....	\$2,566,414.59	\$22,978.17	\$2,589,392.76
Average tons per day.....			383.92
Per cent of possible running time.....			86.3
Stamp duty tons per 24 hours of running time.....			11.51
Values lost in tailings.....			\$101,370.18
Values recovered.....			\$2,488,022.58
Total values per ton in tailings.....		\$	0.723
Per cent of gold extracted.....			96.085

Manitoba.

Several companies report development work but there was no production during the year from the Province.

Saskatchewan.

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver Lake. A number of prospectors went in with the opening of navigation.

Alberta.

In past years there has been a small production of gold from the gravels of the Saskatchewan river. No recovery, however, is reported in 1913. Statistics of the production from the above mentioned source since 1887 are shown in the table following.

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Value.
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66,389
32,425
63,849
42,625
1,788,596
4,543,690
8,885,595

reports:—

31, 1914.
45,305
74,598.29
8.77
30,866.79
73,730.85

Alberta:—Annual Production of Gold.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	102	2,100	1901.....	726	15,000
1888.....	58	1,200	1902.....	481	10,000
1889.....	967	20,000	1903.....	48	1,000
1890.....	193	4,000	1904.....	24	500
1891.....	266	5,500	1905.....	121	2,500
1892.....	508	10,500	1906.....	39	800
1893.....	460	9,610	1907.....	33	600
1894.....	726	15,000	1908.....	50	1,000
1895.....	2,419	50,000	1909.....	25	500
1896.....	2,661	55,000	1910.....	89	1,800
1897.....	2,419	50,000	1911.....	10	200
1898.....	1,209	25,000	1912.....	73	1,500
1899.....	726	15,000	1913.....		
1900.....	242	5,000			
				14,684	303,500

*Calculated from the value: one dollar=0.048375 ozs.

British Columbia.

The gold production of British Columbia in 1913, as reported to the Department, amounted to \$6,149,027, comprising: placer gold \$510,000; bullion from milling ores, \$661,705; and smelter recoveries, \$4,977,322. The statistics for lode gold represent, as closely as can be ascertained, the actual gold recovery based on smelter recoveries and bullion shipments.

There was a considerable decrease in the placer production. Of the 1913 production, 8 per cent was from alluvial workings, 11 per cent from mill bullion, and 81 per cent from ores sent to the smelters.

Statistics of the production by districts in 1913, as published by the Provincial Department of Mines, and the total annual production since 1858 are given in the tables following.

British Columbia:—Production of Gold by Districts, 1913.*

Value.	Districts.	GOLD PLACER.		GOLD LODE.	
		Ozs.	Value.	Ozs.	Value.
\$			\$		\$
15,000	Cariboo:—				
10,000	Cariboo.....	6,550	131,000		
1,000	Quesnel.....	1,500	30,000		
500	Omineca.....	300	6,000	62	1,281
2,500	Cassiar:—				
800	Atlin.....	15,750	315,000	1,355	28,008
675	All other.....	650	13,000	29	599
1,037	East Kootenay:—				
525	Fort Steele.....	100	2,000		
1,850	West Kootenay:—				
207	Ainsworth.....			25	517
1,509	Nelson.....	50	1,000	26,321	514,117
	Slocan.....			252	5,299
	Trail creek.....			137,004	2,831,873
	Others.....	100	2,000	54	1,116
	Lillooet.....	150	3,000	1,368	28,277
	Yale:—				
	Grand Forks, Greenwood, and Osoyoos.....	50	1,000	101,195	2,091,701
	Similkameen.....	150	3,000	1	20
	Yale, Ashcroft and Kamloops.....	100	2,000	25	517
	Const.....	50	1,000	4,590	94,255
		25,500	510,000	272,254	5,627,490

*From Annual Report of the Minister of Mines for British Columbia.

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British Columbia:—Annual Production of Gold.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		\$			\$
1858	34,104	705,000	1887	33,558	693,000
1859	78,129	1,615,072	1888	29,831	610,000
1860	107,806	2,228,543	1889	28,489	588,000
1861	128,973	2,666,118	1890	21,918	449,000
1862	128,528	2,650,903	1891	20,792	429,000
1863	189,318	3,913,563	1892	19,327	399,000
1864	180,722	3,735,850	1893	18,360	379,000
1865	168,887	3,491,205	1894	25,664	530,000
1866	128,779	2,662,106	1895	61,280	1,266,000
1867	120,012	2,480,868	1896	86,504	1,782,000
1868	114,792	2,372,972	1897	131,805	2,724,000
1869	85,865	1,774,978	1898	142,215	2,936,000
1870	64,673	1,336,956	1899	203,295	4,203,000
1871	87,048	1,790,440	1900	228,916	4,733,000
1872	77,931	1,610,972	1901	257,292	5,311,000
1873	63,166	1,305,741	1902	284,383	5,900,000
1874	89,233	1,844,618	1903	284,108	5,870,000
1875	119,724	2,474,904	1904	275,975	5,700,000
1876	86,429	1,786,648	1905	285,529	5,900,000
1877	77,796	1,608,182	1906	269,886	5,570,000
1878	61,688	1,275,204	1907	236,216	4,880,000
1879	62,407	1,290,058	1908	286,858	5,920,000
1880	49,044	1,013,827	1909	250,320	5,170,000
1881	50,636	1,046,737	1910	261,386	5,400,000
1882	46,154	954,045	1911	238,496	4,930,000
1883	38,422	794,252	1912	251,815	5,200,000
1884	35,612	736,165	1913	267,459	6,140,000
1885	34,527	713,738			
1886	43,714	903,651			
				7,091,810	146,600,000

‡Calculated from the value: one dollar = 0.048375 oz.

Among the camps of the Province, Rossland comes first as gold producer, with the Boundary, second, and then Nelson and the Coast districts.

The chief producers in the Rossland district were: the Centre Star and Le Roi groups owned by the Consolidated Mining and Smelting Company of Canada, Ltd., and the Le Roi II (Josie) Mine of the Le Roi No. 2 Mining Co., Ltd.

The Boundary production of gold is from the low grade ores of the district which will average only about 0.04 to 0.05 ounces of gold per ton. The principal operating mines in 1913 were the Granby mines at Phoenix, the Mother Lode at Deadwood, and Rawhide, near Phoenix. In addition to these the Nickel Plate mine at Hedley is the premier gold mine of the Province, and the Jewel-Denero mine at Long Lake, near Greenwood, entered the shipping list toward the close of the year.

A considerable number of shippers contributed to the shipments of gold from the Nelson division, and a small production came from the Coast where the Marble Bay mine was the chief gold producer.

Yukon.

The production of the Yukon in 1913 was \$5,846,780, as compared with \$5,540,206 in 1912, an increase of \$207,484, or 5.36 per cent. In this is included the production from the lode mines.

The statistics of production of gold in the Yukon district during the years between 1898 and 1906, as given in the table showing the annual production, are based primarily on the receipts of gold at the United States mints and receiving offices credited to the Canadian Yu'on. Although a royalty was exacted on the gold output, it seems certain that considerable amounts of gold were produced which escaped royalty payment especially during the years of high production.

Since 1906 the statistics of gold production of the Yukon have been based on the royalty of 2½ per cent which is collected by the Interior Department. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed on the crude gold. The actual value of the deposits for a number of years, as shown by the experience of the United States assay office, has been about \$16.50 per ounce. At the Canadian assay office at Vancouver, B.C., there were deposited during the twelve months ending December 31, 1913, 15,235.29 ounces from the Yukon, valued, after all charges had been deducted, at \$247,188.95, showing an average value of \$16.22 per ounce.

The production of crude placer gold in the Yukon during the past six years, as ascertained by the Interior Department, and upon which a royalty of 2½ per cent has been collected, is shown in the accompanying table:

Production of Crude Gold in the Yukon District.

Month.	1908.	1909.	1910.	1911.	1912.	1913.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
January.....	2,464.00	69.50	16.68		5.25	19.30
February.....	47.30	115.33	749.28	435.66	525.29	56.90
March.....	16.65	848.39	193.81	13.30	0.50	
April.....	947.00	3.75	0.50			1,293.69
May.....	6,851.96	117.33	43.83	16,719.16	26,158.66	5,557.35
June.....	51,530.90	62,254.92	54,301.17	38,499.39	54,243.03	67,594.39
July.....	35,291.11	52,126.43	37,912.31	42,783.38	58,283.29	57,873.50
August.....	37,930.99	47,440.83	47,673.06	47,677.49	56,975.55	63,315.92
September.....	39,654.27	44,466.20	57,695.65	48,383.63	53,225.29	58,641.62
October.....	37,028.98	26,572.23	51,888.18	58,690.82	66,518.01	66,798.37
November.....	1,989.39	4,858.69	21,404.29	11,997.51	11,618.08	26,565.50
December.....	5,491.76	892.75	3,563.75	13,130.63	7,432.72	5,183.50
	219,344.31	239,766.35	275,472.51	277,430.97	335,015.67	352,900.04

In 1913 the placer production is estimated at \$5,836,072 in gold, representing 282,320 fine ounces of metal, and 63,522 fine ounces of silver,

valued at \$37,980, being at the average price of silver for the year, making the total valuation of the Yukon placer output \$5,874,052. In 1912 the placer production was estimated at \$5,576,493, representing 267,988 fine ounces of gold, valued at \$5,539,808, and 60,302 fine ounces of silver, valued at \$36,685.

Statistics of the annual production of gold in the district since 1885 are shown in the following table:

Annual Production of Gold in Yukon.

Calendar Year.	Ozs. (fine [†]).	Value.	Calendar Year.	Ozs. (fine [†]).	Value.
		\$			\$
1885	4,837	100,000	1900	1,077,553	22,275.
1886	3,386	70,000	1901	870,750	18,000.
1887	1,935	40,000	1902	701,437	14,500.
1888	8,466	175,000	1903	592,594	12,250.
1889	8,466	175,000	1904	507,938	10,500.
1890	1,935	40,000	1905	381,001	7,876.
1891	4,233	87,500	1906	270,000	5,600.
1892	8,514	176,000	1907	152,381	3,150.
1893	6,017	125,000	1908	171,150	3,600.
1894	12,094	250,000	1909	191,565	3,960.
1895	14,513	300,000	1910*	221,091	4,570.
1896	120,957	2,500,000	1911*	224,197	4,631.
1897	483,750	10,000,000	1912*	268,417	5,519.
1898	774,000	16,000,000	1913*	282,838	5,846.
1899				7,369,955	152,330.

[†]Calculated from the value: one dollar = 0.048375 oz.
*Including a small production from lode mines.

Since 1898 a royalty to the extent of \$4,115,974 has been collected on the gold production of this district. The yearly amounts collected well as the annual production of gold as ascertained by the Interior Department, are shown in the accompanying table. The difference between the figures and those shown in the table of annual production of the district which are based on mint receipts of Yukon gold, has already been mentioned and is probably due to three factors: (1) the fixing of the value of gold for royalty purposes at \$15 per ounce, a figure from \$1 to \$2 less than the actual value of the gold, (2) the probability that in the earlier years of royalty collection, considerable quantities of gold dust left the country unrecorded and escaped royalty payments, and (3) the fact that in the few years there has been a small but growing production from the mines.

Gold Production in the Yukon, and Royalty Collected.†

Fiscal Year.	Total gold production.	Total exemption.	Royalty collected on.	Royalty paid.
	\$	\$	\$	\$ etc.
1898.....	1,072,773	339,845	2,732,928	273,292 82
1899.....	7,582,283	1,690,657	5,882,626	588,262 37
1900.....	9,809,464	2,501,744	7,307,720	730,771 95
1901.....	9,102,082	1,927,666	7,236,522	592,690 65
1902.....	9,595,310	1,199,114	8,397,225	331,436 79
1903.....	12,113,015	.....	12,113,015	302,893 48
1904.....	10,790,661	.....	10,790,661	272,217 98
1905.....	8,222,051	.....	8,222,051	206,760 87
1906.....	6,510,007	.....	6,510,007	163,063 25
1907 (9 months).....	3,304,791	.....	3,304,791	82,622 42
1908.....	2,820,162	.....	2,820,162	70,505 65
1909.....	3,260,282	.....	3,260,282	81,507 07
1910.....	3,594,251	.....	3,594,251	89,814 10
1911.....	4,126,728	.....	4,126,728	101,168 19
1912.....	4,024,237	.....	4,024,237	100,606 29
1913.....	5,018,412	.....	5,018,412	125,460 52

†From the Report of the Yukon and Mining Lands Branch of the Department of the Interior.

During the calendar year 1913 there were imported: gold bullion valued at \$840,435; gold coins, \$12,495,028; and manufactures of gold and silver, valued at \$1,055,837.

The exports of gold in dust, nuggets, etc., in the same period were valued at \$12,770,838.

LEAD.

The following statistics of the production of lead in Canada in 1913 are based on direct smelter returns, and represent mainly the amount of lead refined in Canada, and shipped as pig lead or manufactured products.

Though mainly from British Columbia, there was yet a small production in 1913 both from Ontario and the Yukon, the total production for the year being 37,662,703 pounds, valued at \$1,754,705. In 1912 the production was 35,763,476 pounds.

While a considerable increase is shown, it would appear from comparison of the metal content of ores shipped to the smelters in 1912 and 1913, that a large tonnage of ore was in stock at the smelters at the close of 1913, so that a far greater increase took place in the output of the mines than is indicated by the smelter recovery for the year.

In valuing the lead production for 1913, the average price per pound at Montreal has been used. The New York market is practically closed to Canadian lead by the high tariff, and to the London market price must be added the freight, etc., to reach the Canadian market. The price at Montreal, the main Canadian market, is usually lower than that at New York (the year 1913 being an exception) and higher than that at London, and is probably a more equitable valuation to place upon the Canadian production.

Statistics showing the lead production since 1887 are given in the following table:—

Annual Production of Lead.

Calendar Year.	Lbs.	Price per lb.		Calendar Year.	Lbs.	Price per lb.	
		Cts.	\$			Cts.	\$
1887	204,800	5-400	9,216	1901	51,900,958	4-334	2,249,387
1888	674,500	4-420	29,812	1902	22,956,381	4-069	934,095
1889	165,100	3-930	6,488	1903	18,139,283	4-237	768,562
1890	105,000	4-480	4,704	1904	37,531,244	4-309	1,617,221
1891	88,665	4-350	3,857	1905	56,861,915	4-707	2,676,633
1892	808,420	4-090	33,064	1906	54,608,217	5-657	3,089,187
1893	2,135,023	3-730	79,636	1907	47,738,703	5-325	2,542,086
1894	5,703,222	3-290	187,636	1908	43,195,733	4-200	1,814,221
1895	16,461,794	3-230	531,716	1909	45,857,424	*3-690	1,692,139
1896	24,199,977	2-980	721,159	1910	32,987,508	3-687	1,216,249
1897	39,018,219	3-580	1,396,853	1911	23,784,969	*3-480	827,717
1898	31,915,319	3-780	1,206,399	1912	35,763,476	†4-467	1,597,554
1899	21,862,436	4-470	977,250	1913	37,662,703	†4-659	1,754,705
1900	63,169,821	4-370	2,760,521				

*In 1909 and 1910, average prices at Toronto as quoted by *Hardware and Metal*, in previous years average prices at New York, as quoted by *Engineering and Mining Journal*.
 †Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co., Montreal, Que.

Previous to 1904 lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion to be refined abroad. A lead refinery employing the Betts electrolytic process is in operation at Trail, B.C., at the smelter there, treating the base bullion produced by the lead blast furnaces.

At the refinery are produced pig lead, fine gold, fine silver, copper sulphate, refined antimony, and bismuth metal, and lead pipe is also manufactured. The refined lead finds a market in Canada, the United States, and the Orient, though in the last few years the greater part of it has been used in Canada.

The production of refined lead, including pig lead and lead pipe, has been as follows:—

Year.	Refined lead produced.	Year	Refined lead produced.
1904	7,519,440	1909	41,883,614
1905	15,804,509	1910	32,987,508
1906	20,471,314	1911	23,784,969
1907	26,607,461	1912	35,715,258
1908	36,549,274	1913	36,413,821

The North American Smelting Company erected a plant at Kingston, Ontario, which started operations during the latter part of 1912, treating ores from the United States, British Columbia, and Ontario, and this continued in 1913.

Some British Columbia ores were treated at the Tacoma Smelting Works, Tacoma, Washington, U.S.A.

Prices.—The price of lead in London averages $\frac{1}{2}$ to 2 cents per pound lower than in New York.

The average price for soft lead in 1913 on the London market was £18 6s. 2d. per long ton, as compared with £17 15s. 11d. in 1912, and £13 19s. 3d. in 1911.

The price of lead on the Canadian market at Montreal is intermediate between the New York and London values. Montreal is the main Canadian market. The Toronto price in winter is about the same as that at Montreal, but the latter falls during the period of summer freight rates, about 10 cents per 100 pounds below the former. The average price of lead in Montreal in 1913 was 4.659 cents per pound, against 4.072 in London, and 4.370 in New York.

The monthly and yearly average prices for lead in Montreal for the past five years are given in the following table:—

Price of Pig Lead at Montreal.*

Month.	1909.	1910.	1911.	1912.	1913.
January.....	3.35	3.48	3.31	3.73	4.32
February.....	3.38	3.40	3.32	3.7	4.18
March.....	3.42	3.34	3.34	4.03	4.05
April.....	3.35	3.21	3.26	4.10	4.42
May.....	3.26	3.13	3.20	4.08	4.66
June.....	3.23	3.15	3.27	4.34	4.98
July.....	3.12	3.13	3.33	4.57	4.93
August.....	3.05	3.11	3.45	4.84	5.02
September....	3.14	3.11	3.63	5.47	5.02
October.....	3.26	3.23	3.77	5.07	4.99
November.....	3.28	3.31	3.93	4.53	4.82
December.....	3.34	3.35	3.95	4.55	4.52
Average.....	3.268	3.246	3.480	4.467	4.659

*Producers prices for car-load quantities ex cars Montreal as furnished by Messrs. The Robertson & Co., Ltd., of Montreal.

The average prices of lead in New York as quoted by the *Engineering and Mining Journal*, are shown in the following table:—

Monthly Average Prices of Lead in New York, in Cents per Pound

Month.	1903	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
January.....	4.075	4.347	4.552	5.600	6.000	3.691	4.175	4.700	4.483	4.435	4.3
February.....	4.075	4.375	4.450	5.464	6.000	3.725	4.018	4.613	4.440	4.026	4.3
March.....	4.442	4.475	4.470	5.350	6.000	3.833	3.986	4.459	4.394	4.073	4.3
April.....	4.567	4.475	4.500	5.404	6.000	3.993	4.168	4.376	4.412	4.200	4.3
May.....	4.325	4.423	4.500	5.685	6.000	4.253	4.287	4.315	4.373	4.194	4.3
June.....	4.210	4.196	4.500	5.750	5.760	4.466	4.350	4.343	4.455	4.392	4.3
July.....	4.075	4.192	4.524	5.750	5.288	4.447	4.321	4.404	4.499	4.720	4.3
August.....	4.075	4.111	4.665	5.750	5.250	4.580	4.363	4.400	4.500	4.569	4.3
September....	4.243	4.200	4.850	5.750	4.813	4.515	4.342	4.400	4.485	5.048	4.3
October.....	4.375	4.200	4.850	5.750	4.750	4.351	4.341	4.400	4.265	5.071	4.3
November.....	4.218	4.200	5.200	5.750	4.376	4.330	4.370	4.442	4.298	4.615	4.3
December.....	4.162	4.600	5.422	5.900	3.658	4.213	4.560	4.500	4.450	4.303	4.3
Average.....	4.237	4.309	4.707	5.657	5.325	4.200	4.273	4.446	4.420	4.471	4.3

The average monthly prices of soft lead in London, England, as published by Julius Matton, of London, and "Metallgesellschaft" of Frankfort-on-the-Main, were, from 1904 to 1913, as follows:—

Average Monthly Prices of Lead in London, £ per Long Ton.

Month.	1901.			1905.			1906.			1907.			1908.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January..	11	11	2	12	17	6	16	17	6	19	16	0	14	10	6
February..	11	11	10	12	9	3	16	0	4	19	11	8	11	5	6
March..	12	0	9	12	5	11	15	17	9	19	14	6	14	1	4
April..	12	5	1	12	13	2	15	16	6	19	16	7	13	13	10
May..	11	15	11	12	15	3	16	13	6	19	17	7	13	2	7
June..	11	10	5	13	0	0	16	15	6	20	6	0	12	15	7
July..	11	13	4	13	12	2	16	11	7	20	8	2	12	19	6
August..	11	14	9	13	19	2	17	1	3	19	0	3	13	9	10
September	11	15	9	13	19	0	18	4	4	19	17	6	13	3	0
October.....	12	3	0	11	13	7	19	7	9	18	13	0	13	7	3
November..	12	17	10	15	6	9	19	5	6	17	4	11	13	12	2
December..	12	15	6	17	1	0	19	12	6	14	9	4	13	3	6
Yearly average.....	11	19	8	13	14	5	17	7	0	19	1	10	13	10	5

Month.	1909.			1910.			1911.			1912.			1913.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January..	13	3	6	13	3	11	13	0	8	15	11	3	17	1	11
February..	13	5	5	13	7	3	13	1	11	15	13	9	16	8	5
March..	13	8	8	13	2	9	13	2	11	15	19	8	15	19	8
April..	13	7	0	12	13	9	12	13	5	16	6	6	17	8	10
May..	13	5	3	12	11	8	12	19	2	16	10	2	18	14	3
June..	13	2	4	12	13	9	13	5	5	17	11	8	19	10	8
July.....	13	3	12	11	8		13	10	11	18	8	9	19	7	10
August.....	10	6	12	10	10		14	1	4	19	5	8	19	15	8
September	15	3	12	12	6		14	15	1	21	9	0	19	14	10
October....	4	4	13	2	0		15	6	1	20	8	0	19	9	5
November..	13	1	4	13	4	6	15	15	5	18	4	7	18	13	9
December....	13	2	11	13	3	9	15	13	4	18	1	6	17	8	8
Yearly average.....	13	1	8	12	19	0	13	19	3	17	15	11	18	6	2

Bounties.—In 1901, and again in 1903, the Dominion Government, to encourage the lead industry, authorized the payment of a bounty on the production of lead. The Act of 1903 provided for the payment, under certain restrictions, of 75 cents per hundred pounds on lead contained in ore mined and smelted in Canada, provided that when the standard price of pig lead in London, England, exceeded £12 10s. per ton of 2,240 pounds, such bounty should be reduced proportionately by the amount of such excess. Thus, when the price of lead in London rose to £16, or over, per long ton, the bounty ceased. As the price of lead exceeded £16 sterling on the London market for a considerable period during 1906 and 1907 the bounty paid during those years was comparatively small.

The Act of 1903 provided that payment of bounty should cease on June 30, 1908 and as only a portion of the funds provided had been used, a new Act was passed in the latter year providing for further bounty payments at the rate of 75 cents per hundred pounds, or approximately £3 10s. per ton of 2,240 pounds, subject to the restriction that when the price of lead in London exceeds £14 10s. the bounty shall be reduced by such excess.

The Act of 1908 expired in 1913, and a new Act was passed extending the bounty for a further period of five years, with the same provisions. The text of this Act follows:—

3-4 GEORGE V, CHAPTER 29.

An Act Respecting the Payment of Bounties on Lead Contained in Lead-bearing Ores Mined in Canada.

(Assented to June 6, 1913.)

Whereas, under the provisions of chapter 31 of the statutes of 1903 and of chapter 43 of the statutes of 1908, as amended by chapter 37 of the statutes of 1910, the amount of bounty payable on lead contained in lead-bearing ores mined in Canada was not to exceed two million four hundred and fifty thousand dollars; and whereas the time within which the said amount is payable for the purpose aforesaid expires, under the provisions of the said chapter 43, on the thirtieth day of June, nineteen hundred and thirteen, and here will then remain unexpended of the said sum approximately six hundred thousand dollars: Therefore His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada enacts as follows:—

1. This Act may be cited as *The Lead Bounties Act, 1913.*

2. The Governor in Council may authorize the payment of a bounty of seventy-five cents per one hundred pounds on lead contained in lead-bearing ores mined in Canada, on and after the first day of July, nineteen hundred and thirteen, such bounty to be paid to the producer or vendor of such ores: Provided that the sum to be paid as such bounty shall not exceed two hundred and fifty thousand dollars in any year ending on the thirtieth day of June; provided also that when it appears to the satisfaction of the Minister charged with the administration of this Act that the standard price of pig lead in London, England, exceeds fourteen pounds ten shilling sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

2. The total amount of bounty payable under the provisions of chapter 31 of the statutes of 1903, chapter 43 of the statutes of 1908 (as amended

by chapter 37 of the statutes of 1910), and of this Act, shall not exceed two million four hundred and fifty thousand dollars.

3. Payment of the said bounty may be made from time to time to the extent of sixty per cent upon smelter returns showing that the ore has been delivered for smelting at a smelter in Canada. The remaining forty per cent may be paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

2. If at the close of any year it appears that during the year the quantity of lead produced on which the bounty is authorized, exceeds sixteen thousand six hundred and sixty-seven tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payment for the year within the limit mentioned in section 2 of this Act.

4. If at any time it appears to the satisfaction of the Governor in Council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor in Council may authorize the payment of bounty at such reduced rates as he deems just, on the lead contained in such ores mined in Canada, and exported for treatment abroad.

5. If at any time it appears to the satisfaction of the Governor in Council that products of lead are manufactured in Canada direct from lead ores mined in Canada without the intervention of the smelting process, the Governor in Council may make such provision as he deems equitable to extend the benefits of this act to the producers of such ores.

6. The Governor in Council may make regulations for carrying out the intention of this Act.

7. The bounties payable under the provisions of this Act shall cease and determine on the thirtieth day of June one thousand nine hundred and eighteen.

The regulations under which the Act is administered are as follows:—

1. The Minister of Trade and Commerce is charged with the administration of this Act.

2. All producers or vendors of lead-bearing ores who desire to avail themselves of the provisions of the Act above quoted, and to be paid bounty, shall, before making claim for such bounty, notify the Minister of their intention to claim under the provisions of the Act, and shall declare the

name of the mine producing such ore, its situation, the names of the president, secretary, and manager, as well as the name of the official authorized to make claim. Notice shall be given the Minister of changes in ownership and management. Where the bounty is claimed by lessees, the consent of the owner shall be shown.

3. All claims for the payment of bounty shall be made and substantiated under the oath of the manager of the mine or of the official authorized to make the claim.

4. Claims may be made monthly, that is, immediately after the close of each calendar month, and be in such form, and contain such evidence, as may seem to the Minister, from time to time, necessary.

5. No claims made otherwise than in conformity with these regulations, and in form required by the Minister, shall be recognized, allowed or paid by the Minister.

6. The smelting of all such ore shall at all times be under the supervision of the officers of the Department of Trade and Commerce, appointed or detailed for the purpose.

7. The supervising officer may at any time demand and receive a portion of the floor sample of any ore delivered at the smelter for smelting purposes.

8. The rate of bounty shall be computed according to the London quotation upon the day the ore is taken into stock at the smelter, such date not to be later than the last day of the calendar month during which the ore was unloaded from cars at the smelter grounds.

9. The lead contents of ores shall, for the purpose of this Act, be ascertained by fire assay, as used in ordinary commercial assaying.

10. The books of the claimants, and those of the smelting works at which the ore is smelted, shall be at all times open to the inspection of such supervising officer, and of any officer of the Department of Trade and Commerce who may be detailed by the Minister for the purpose.

11. All claims shall be substantiated by the oath of the Manager of the smelting works at which the ores are smelted, and shall be verified and certified to by the officer of the Department of Trade and Commerce appointed to supervise the smelting at the works where it has been carried on.

12. The cost of the supervision shall be paid by the claimants and may be deducted pro rata according to the quantity smelted during the fiscal year, from the amount payable to such claimants at the close of each fiscal year.

Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1914.

Year ending.	Bounty paid.	Year ending.	Bounty paid.
	\$		\$
June 30, 1899.....	76,665	March 31, 1907 (9 mos.).....	1,995
" 30, 1900.....	43,335	" 31, 1908.....	51,001
" 30, 1901.....	30,000	" 31, 1909.....	307,433
" 30, 1902.....		" 31, 1910.....	340,542
" 30, 1903.....	4,380	" 31, 1911.....	248,534
" 30, 1904.....	195,027	" 31, 1912.....	179,288
" 30, 1905.....	330,645	" 31, 1913.....	68,065
" 30, 1906.....	90,196	" 31, 1914.....	8,179
		Total.....	\$ 1,975,885

Exports and Imports:—According to Trade and Navigation reports, the total quantity of lead contained in ore and concentrates exported during the calendar year 1913 was 329,960 pounds valued at \$9,136. During 1912 the export was 299,240 pounds valued at \$8,193.

Details of exports 1909 to 1913 are as follows:—

Exports of Lead, 1909 to 1913.

	LEAD IN ORE, CONCENTRATES, ETC.		PIG LEAD.	
	Lbs.	Value.	Lbs.	Value.
		\$		\$
1909.				
To United States.....	6,090,852	126,478	250	8
To other countries.....	129,216	0,100	11,301,680	361,056
Total.....	6,220,068	132,578	11,301,960	361,064
1910.				
To United States.....	46,800	1,308	59,605	2,295
To other countries.....			7,652,648	245,879
Total.....	46,800	1,308	7,712,253	248,174
1911.				
To United States.....	65,100	1,826	71,961	2,806
To other countries.....				
Total.....	65,100	1,826	71,961	2,806
1912.				
To United States.....	299,240	8,193		
To other countries.....				
Total.....	299,240	8,193		
1913.				
To United States.....	329,960	9,136		
To other countries.....				
Total.....	329,960	9,136		

The exports of lead since 1873 are shown in the following table:—

Exports of Lead.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1873.....		1,993	1894.....	5,792,700	144,509
1874.....		127	1895.....	23,075,892	435,071
1875.....		7,510	1896.....	26,480,320	462,095
1876.....		66	1897.....	42,802,697	925,144
1877.....		720	1898.....	37,375,678	885,485
1878.....			1899.....	15,799,518	466,950
1879.....		230	1900.....	57,642,029	1,917,690
1880.....			1901.....	45,500,995	1,804,687
1881.....			1902.....	17,761,484	457,170
1882.....		32	1903.....	18,624,303	426,466
1883.....		5	1904.....	25,868,823	559,461
1884.....		36	1905.....	41,637,403	1,046,541
1885.....			1906.....	21,436,022	736,007
1886.....			1907.....	25,591,883	1,029,898
1887.....		724	1908.....	18,454,594	622,454
1888.....		18	1909.....	17,528,028	493,642
1889.....		18	1910.....	7,759,053	249,482
1890.....			1911.....	137,061	4,032
1891.....		5,000	1912.....	299,240	8,193
1892.....		2,509	1913.....	329,960	9,136
1893.....		3,099			

The principal imports of lead during the calendar years 1911, 1912, and 1913 were as follows:—

	Calendar year 1911.		Calendar year 1912.		Calendar year 1913.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		\$		\$		\$
Old, scrap, pig, and block.....	9,989	495,923	14,089	940,583	5,600	464,117
Bnrs and sheets.....	1,542	55,458	961	93,702	747	62,527
Pipe.....	256	19,426	344	32,423	233	21,679
Shot and bullets.....	4	1,053	239	23,163	215	19,582
Manufactures of lead.....		108,012		144,571		155,178
Ten lead.....	1,344	134,160	1,606	167,716	1,737	217,009
Litharge.....	899	65,743	1,296	113,941	500	50,734
Total.....	14,034	879,775	18,535	1,516,099	9,032	990,826
Metallic lead contained in imported lead pigments.....	1,597	169,501	2,345	290,122	1,852	224,607
	15,631	1,049,276	20,880	1,806,221	10,884	1,215,433

Statistics of the annual imports since 1880 of (1) lead; (2) manufactures of lead; (3) litharge; (4) dry white and red lead, are given in the tables following:—

Imports of Lead.

Fiscal Year.	OLD, SCRAP, AND FIG.		Average price.	BARS, BLOCKS, SHEETS.		Average price.	TOTAL.	
	Cwt.	Value.		Cwt.	Value.		Cwt.	Value.
		\$	\$		\$	\$		\$
1880.....								
1881.....	16,236	56,919	3 51	18,222	70,744	2 88	30,298	124,117
1882.....	36,655	120,870	3 30	10,540	35,728	3 39	34,458	127,603
1883.....	48,680	118,759	3 06	8,591	28,785	3 35	47,195	156,508
1884.....	39,469	103,413	2 62	9,704	28,458	2 93	57,371	177,544
1885.....	36,100	87,038	2 41	9,362	24,396	2 61	49,113	131,474
1886.....	39,945	110,947	2 78	9,793	28,948	2 96	45,468	111,434
1887.....	61,160	173,477	2 84	14,133	41,746	2 95	49,738	139,895
1888.....	68,678	196,845	2 87	14,957	45,900	3 06	75,313	215,223
1889.....	74,223	213,132	2 87	14,173	43,482	3 07	83,635	242,745
1890.....	101,197	283,096	2 80	19,083	59,484	3 12	88,396	256,614
1891.....	86,382	243,033	2 81	15,646	48,220	3 08	102,028	291,253
1892.....	97,375	254,384	2 61	11,299	32,368	2 86	108,674	286,752
1893.....	94,485	215,521	2 28	12,403	32,286	2 60	106,888	217,807
1894.....	70,223	149,440	2 13	8,486	20,451	2 41	78,709	169,891
1895.....	67,261	139,290	2 07	6,739	16,315	2 42	74,000	155,605
1896.....	72,433	173,162	2 39	8,575	23,169	2 70	81,098	196,331
1897.....	65,279	158,381	2 43	10,516	29,175	2 77	75,795	187,556

Fiscal Year.	OLD, SCRAP, FIG. AND BLOCK.*		Average price.	BARS AND SHEETS. †		Average price.	TOTAL.	
	Cwt.	Value.		Cwt.	Value.		Cwt.	Value.
1898.....	88,420	260,779	2 95	22,214	39,041	1 76	110,634	299,820
1899.....	114,659	283,432	2 47	44,796	39,833	0 89	159,455	323,265
1900.....	62,361	207,819	3 33	15,493	53,506	3 45	77,854	251,325
1901.....	(a) 85,321	97,011	1 14	16,295	78,316	4 81	101,616	175,327
1902.....	(a) 122,279	104,672	0 86	18,596	49,261	2 65	140,875	153,933
1903.....	(a) 98,530	67,821	0 69	11,535	35,398	3 07	110,065	103,219
1904.....	(a) 94,602	121,135	1 28	14,102	39,644	2 81	108,701	160,809
1905.....	(a) 57,074	133,775	2 34	17,792	51,972	2 92	74,866	185,747
1906.....	82,729	271,105	3 28	16,106	57,185	3 55	98,835	328,290
1907.....	79,575	277,470	3 49	13,710	56,630	4 13	93,285	334,100
1908.....	63,921	284,604	4 45	17,253	75,180	4 36	81,174	359,790
1909.....	59,110	151,173	3 02	13,754	46,093	3 35	63,864	197,266
1910.....	113,249	191,971	1 70	11,446	37,004	3 23	124,695	228,975
1911.....	116,655	334,159	2 86	15,587	55,312	3 55	132,242	389,471
1912.....	241,030	602,990	2 50	29,901	52,886	1 77	270,931	655,876
1913.....	242,053	849,332	3 51	20,237	98,935	4 88	262,290	943,267

*Duty 15 per cent.

†Duty 25 per cent.

(a) Includes Canadian lead ore sent to the United States for refining, imported at price of refining only.

Imports of Lead Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
1880.	\$ 15,400	1892.	\$ 22,636	1903	\$ 131,151
1881	22,629	1893	33,743	1904	129,093
1882	17,282	1894	39,361	1905	147,177
1883	25,556	1895	38,015	1906	163,793
1884	31,361	1896	50,722	1907	162,425
1885	36,310	1897	60,735	1908	243,926
1886	33,078	1898	63,179	1909	213,167
1887	19,140	1899	91,497	1910	234,930
1888	18,816	1900	104,736	1911	235,248
1889	16,315	1901	107,260	1912	272,625
1890	25,600	1902	120,020	1913	148,141
1891	33,898				

Imports of Litharge.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
1880	7,041	\$ 14,334	1892	10,384	\$ 34,343	1903	13,921	\$ 47,760
1881	6,126	22,120	1893	7,685	24,401	1904	9,894	32,630
1882	2,900	16,651	1894	38,547	28,685	1905	17,865	57,730
1883	1,532	6,173	1895	11,955	32,953	1906	10,165	39,830
1884	5,235	18,132	1896	10,710	32,817	1907	11,311	49,180
1885	4,990	16,156	1897	12,028	34,538	1908	19,052	90,770
1886	4,928	16,003	1898	10,446	32,904	1909	12,117	43,560
1887	6,397	21,365	1899	9,530	32,518	1910	18,101	62,170
1888	7,010	23,808	1900	9,139	29,176	1911	16,543	59,990
1889	8,089	31,082	1901	11,132	51,944	1912	16,419	59,990
1890	9,453	31,401	1902	13,002	47,021	1913	26,402	116,900
1891	7,979	27,613						

The imports of white and red lead and orange mineral during the fiscal year 1913 amounted to 6,331,760 pounds, valued at \$320,990. During the calendar year ending December the imports were 4,609,200 pounds valued at \$224,607. The decrease from 1903 to 1910 was consequent to the establishment of corroding works in Canada; and the increase since, due to the excess of consumption over home production.

Detailed statistics of imports of lead pigments during the calendar years 1911, 1912, and 1913 are shown in the table following, with statistics of imports during the fiscal years since 1885 in the table next succeeding.

Imports of White and Red Lead in 1911, 1912, and 1913.

	Calendar Year 1911.		Calendar Year 1912.		Calendar Year 1913	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Lead, white, dry	1,467,193	58,335	2,499,725	138,027	1,162,082	61,424
Lead, white, ground in oil	1,033,732	46,986	714,362	37,916	1,057,083	59,444
Lead, red, dry and orange mineral	1,571,508	64,180	2,539,767	113,579	2,389,460	103,730
	4,072,433	169,501	5,753,854	290,122	4,609,225	224,607

Imports of Dry White and Red Lead and Orange Mineral, and White Lead Ground in Oil.

Fiscal Year.	Lbs.	Value.	Average	Fiscal Year.	Lbs.	Value.	Average
			price.				price.
		\$	Cts.			\$	Cts.
1885	5,540,733	198,913	3 69	1900	11,679,920	634,492	4 32
1886	6,704,077	214,258	3 18	1901	10,241,601	461,368	4 50
1887	6,998,820	234,725	3 34	1902	13,584,164	693,582	3 87
1888	6,361,311	216,654	3 41	1903	19,298,786	758,371	3 95
1889	7,066,465	267,236	3 78	1904	16,925,585	662,098	3 91
1890	10,859,672	381,959	3 52	1905	17,376,588	638,381	3 67
1891	8,560,615	337,497	3 91	1906	10,112,891	417,441	4 01
1892	10,288,766	351,686	3 42	1907	5,956,626	290,629	4 88
1893	10,865,183	364,680	3 36	1908	7,830,860	429,537	5 37
1894	10,958,170	353,653	3 22	1909	4,687,416	195,258	4 17
1895	8,780,052	282,351	3 22	1910	3,585,921	141,114	3 91
1896	11,711,496	367,569	3 14	1911	3,367,091	161,897	4 08
1897	10,310,463	317,549	3 37	1912	3,810,971	158,860	4 17
1898	12,682,808	448,659	3 54	1913	6,331,760	329,998	5 07
1899	14,507,945	514,842	3 55				

The production of lead as already shown was, in 1913, 18,832 tons, while the exports of lead were 165 tons, leaving 18,667 tons as the consumption of Canadian lead.

The imports of lead during the calendar year 1913 are shown to have been 10,884 tons, not including certain manufactures of lead valued at \$155,178, so that the total consumption of lead in 1913 probably exceeded 30,000 tons.

Nova Scotia.

There was no production from this Province during the year.

Ontario.

A small shipment was made very early in the year to the North American smelter, but no further shipments are reported.

British Columbia.

As already stated, almost all the production of 1913 was from British Columbia, and there was a decided increase, as is shown in the table following. However, as already pointed out, the amounts of lead in ore shipped from the mines, shows an even greater increase than the smelter recoveries indicate.¹

The record given in this table for the years 1909 to 1913 inclusive represents the recovery of lead at smelter or refinery as distinguished from the figures given for the same years in the table next succeeding, which indicate the quantities of lead in ore sent to the smelters.

British Columbia:—Production of Lead.

Calendar Year.	Lbs.	Value.	Price per pound.	Calendar Year.	Lbs.	Value.	Price per pound.
		\$	Cts.			\$	Cts.
1887 ..	204,800	9,216	4-40	1901 ..	51,582,006	2,235,601	4-33
1888 ..	674,500	29,813	4-42	1902 ..	22,536,331	917,005	4-06
1889 ..	165,100	6,488	3-93	1903 ..	18,089,283	706,443	4-22
1890 ..	Nil.			1904 ..	36,616,244	1,579,086	4-30
1891 ..	Nil.			1905 ..	56,580,703	2,661,254	4-71
1892 ..	808,420	33,064	4-09	1906 ..	52,408,217	2,964,731	5-66
1893 ..	2,131,092	79,490	3-71	1907 ..	47,738,703	2,542,686	5-33
1894 ..	5,703,222	187,636	3-29	1908 ..	43,195,731	1,814,221	4-22
1895 ..	16,461,794	531,716	3-23	1909 ..	45,857,421	1,692,139	3-66
1896 ..	24,199,977	721,159	2-93	1910 ..	32,987,508	1,216,249	3-66
1897 ..	38,841,135	1,390,513	3-58	1911 ..	23,784,969	827,717	3-48
1898 ..	31,691,559	1,198,017	3-78	1912 ..	35,763,176	1,597,551	4-46
1899 ..	21,862,436	977,250	4-47	1913 ..	37,626,899	1,753,037	4-65
1900 ..	62,158,621	2,760,031	4-37				

*Average prices at Toronto for years 1909 and 1910. For previous years average prices New York.

†Average price at Montreal. Quotations furnished by Messrs. Thos. Robertson & Co. Montreal, Que.

¹Under the heading "Mine Production" in the chapter published separately as "A General Summary of the Mineral Production of Canada in 1913," as well as included in the complete Annual Report, will be found a table showing mine shipments.

British Columbia: Production of Lead by Districts.*

	1907.	1908.	1909.	1910.	1911.	1912.	1913.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar				1,695	238,578	41,512	6,579
East Kootenay—							
Fort Steele	37,526,191	30,291,788	27,901,528	21,871,562	17,158,069	18,238,238	18,525,083
Other districts..	71,842	358,270	18,724	66,010		2,249,237	2,495,375
West Kootenay—							
Ainsworth	3,651,775	1,799,216	10,298,313	2,558,353	289,009	1,863,894	9,027,861
Nelson	1,582,115	415,121	1,037,069	1,213,811	1,928,836	2,293,000	1,936,118
Slocan	4,395,826	6,572,268	4,976,199	6,106,358	6,705,571	16,941,811	22,698,766
Other districts..	570,531	903,552	979,916	179,241	522,615	210,762	521,771
Yale ..	25,419	21,215	21,567	35,683	29,719		45,982
Cariboo—							
Omineca..							156,862
	47,738,703	43,135,731	41,496,316	34,658,716	26,872,397	41,871,154	55,361,677

*From the Report of the Minister of Mines, B.C.

The greater number of the lead camps of the Province were active, especially the Slocan and Ainsworth in the south, and the Omineca (Hazelton) in the north.

The old Hot Springs camp at Ainsworth was especially noticeable for its increased shipments.

East Kootenay was fairly quiet though the Sullivan was a heavy shipper.

In the north, the Silver Standard at New Hazelton made some large shipments to Trail, and the Harris Mines also shipped. A considerable amount of development and prospecting is being done in this district.

Yukon.

A few small shipments of lead-bearing ores were made from the Yukon in 1913. Although not important contributors to the tonnage of lead produced, they draw attention to the possibilities of that Territory, where as yet little lode mining has been done.

Ameri-

British
table
in ore
smelterclusive
ed from
, whichPrice per
pound.

Cts.

1	4.341
5	4.069
3	4.237
6	4.309
4	4.707
3	5.657
6	5.325
21	4.200
99	3.690
99	3.687
17	43.480
51	14.467
37	14.659

Average prices at

Robertson & Co.,

as "A General
Complete Annual

MERCURY.

There has been no production of mercury since 1897. The small production reported in 1895 and 1897 was derived from the deposits at the western end of Kamloops lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar in a zone of decomposed Tertiary volcanic rocks.

In Canada mercury has been reported as occurring also in ores of the Cobalt district, and in the neighbourhood of Field, B.C., and Sechart on the west coast of Vancouver island.

Production of Mercury.

Calendar Year.	Flasks. (76½ lbs.)	Price per flask.	Value.
		\$ cts.	\$
1895.....	71	33 00	2,343
1896.....	58	33 44	1,940
1897.....	9	36 00	324

Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$			\$
1882.....	2,443	965	1893.....	50,711	22,998	1904.....	151,107	80,658
1883.....	7,410	2,991	1894.....	36,914	14,483	1905.....	103,330	48,412
1884.....	5,848	2,441	1895.....	63,732	25,703	1906.....	150,304	69,505
1885.....	14,490	4,781	1896.....	77,869	32,353	1907 (9 mos.)	98,368	45,662
1886.....	13,316	7,142	1897.....	76,058	33,531	1908.....	178,111	76,549
1887.....	18,409	10,618	1898.....	59,759	36,425	1909.....	92,220	46,217
1888.....	27,951	14,943	1899.....	103,017	51,695	1910.....	283,980	146,914
1889.....	22,931	11,844	1900.....	85,342	51,987	1911.....	128,980	74,956
1890.....	15,912	7,677	1901.....	140,610	94,564	1912.....	106,953	60,944
1891.....	29,775	20,223	1902.....	97,283	56,615	1913 Duty free	118,967	77,890
1892.....	30,936	15,038	1903.....	164,968	91,625			

MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada there has been very little production of the metal.

In 1902, about 6,500 pounds of molybdenum ore valued at \$400, were reported as having been taken from a deposit in the township of Laxton, county of Victoria, by John Webber of Toronto.

In 1903, Mr. A. W. Chisholm of Kingston, reported the shipment to the United States, and elsewhere, of 85 tons of molybdenum ore valued at \$1,275, culled from about 500 or 600 tons of rock taken from the east half of lot 3, concession XIV, Sheffield township, Addington county.

Some work was done in 1913 on a considerable number of properties in Ontario and Quebec and one in British Columbia, but only a small amount of ore was raised, and that was shipped for experimental treatment.

Prices have varied very considerably during the year, as the market is small and demand and supply uncertain.

The following quotations from the Engineering and Mining Journal of New York, of January 24, 1914, well describes conditions:—

"A subscriber asks for weekly quotations on molybdenum ore. It is impracticable to give market quotations weekly, or even monthly, for molybdenum ore as the market is still too limited and too easily demoralized by any large shipment. However, according to a leading buyer, the prospects for molybdenum are much better this year. The standard ore should contain a minimum of 85 per cent MoS₂.

"Such ore would be worth from \$8 to \$10 per unit, providing the ore be free from copper, arsenic, bismuth and tungsten. Any one of these elements will reduce the price of the ore. For instance: 90 per cent ore free from these elements is at present worth \$12.50 per unit, practically twice the price of tungsten ore. Lower grade ores are worth much less. In addition, ore shipments arrive unexpectedly sometimes, and as soon as there are accumulations of ore the prices drop suddenly. On account of these conditions it is impracticable to name standing prices that would be of assistance to shippers."

The principal purchasers in the United States are:—The Electro-metallurgical Company of America, New York; Primos Chemical Company, Primos, Penn.; DeGobias and Atkins, San Francisco, Cal. In Germany, Friedrich Krupp, of Essen, is a large user of molybdenum.

During 1911 a report on the "Molybdenum Ores of Canada" was issued by the Mines Branch.¹

¹No. 93, "Report on the Molybdenum Ores of Canada," by T. L. Walker, Ph.D., Mines Branch, Department of Mines, Ottawa, 1911.

NICKEL.

The industry based on the mining and metallurgical treatment of the nickel-copper ores of the Sudbury district, Ontario, ranks among the most important in Canada. Not only is there a considerable production of copper, but the nickel, which is the most important product, supplies a very large proportion of the world's consumption of the metal.

The past two years development has very largely increased the known ore reserves of the district. These nickel-copper deposits have been the subject of special reports by the Mines Branch and Geological Survey at Ottawa, and by the Ontario Bureau of Mines, Toronto.¹

The production of ore and its reduction to a Bessemer matte was carried on in 1913 to a greater extent than in any other year. There were mined 784,697 tons of ore. There were smelted 823,403 tons, from which were produced 47,150 tons Bessemer matte, carrying approximately 24,838 tons of nickel and 12,938 tons of copper, the net value of the matte being \$7,076,945. This matte, which is shipped to the United States and Great Britain for refining, carries about 80 per cent of the combined metals, having averaged for the past year 52.7 per cent of nickel and 27.4 per cent copper.

For the production of monel metal, a special matte is produced with contents of 22 per cent copper and 58 per cent nickel, which is included in the total given above. Monel metal is produced directly from this without the intermediate refining of either the nickel or the copper.

Compared with 1912, there was an increase in matte production of 5,225 tons, or 12.4 per cent, and the increase in total nickel content was 2,417 tons, or 10.8 per cent, and in copper 1,822 tons, or 16.4 per cent.

¹Report on Nickel and Copper Deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada. No. 873, 1901.

The Sudbury Nickel Region, by A. P. Coleman, Ph.D., Bureau of Mines, Vol. XIV, Part II, 1904.

The Nickel Industry, with special reference to the Sudbury Region, Ont. Report by A. Coleman, Ph.D., Mines Branch, Ottawa, No. 170, 1913.

The following were the aggregate results of the operations of the nickel-copper deposits of Ontario during the past four years:—

	1910.	1911.	1912.	1913.
	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Ore mined.....	652,392	612,511	737,726	784,697
Ore smelted.....	628,947	610,834	725,065	823,403
Bessemer matte produced.....	35,033	32,697	41,925	47,150
Copper content of matte.....	9,630	8,966	11,116	12,638
Nickel " ".....	18,636	17,019	22,421	24,87
Spot value of metal.....	\$5,380,064	\$4,915,592	\$6,303,102	\$7,076,945
Wages paid miners and smelters.....	\$1,698,152	\$1,830,526	\$2,626,609	\$3,291,956
Men employed.....	1,882	1,885	3,110	3,486

According to Customs returns, exports of nickel in matte, etc., were, for the twelve months ending December 31, as follows:—

	1909.	1910.	1911.	1912.	1913.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
To Great Britain.....	3,843,763	5,325,331	5,023,393	5,072,867	5,164,512
To United States.....	21,772,635	30,679,451	27,596,578	39,118,993	44,224,119
To other countries.....					70,386
	25,616,398	36,014,782	32,619,971	44,221,860	49,459,017

The above figures of the production of nickel do not include that recovered from the silver-cobalt ores of the Cobalt district. Returns are received of the recovery as nickel oxide at Canadian works, but a considerable amount of nickel is contained in ores exported for smelting for which no payment is received by the mines shipping and the amount which is finally recovered is impossible to ascertain.

During 1913 there were shipped from the metallurgical and reduction works of Ontario, 660,079 pounds of cobalt oxide, 268,304 pounds of nickel oxide, also mixed oxides and residues valued at \$90,266, the total value being \$695,855. The residues contained a considerable quantity of nickel which, however, was not paid for.

Bounty on Refined Nickel and Nickel Oxide:—Under the term of "The Metal Refining Act, 1907" of the Province of Ontario (7 Edward VII, Chap. XIV) a bounty is authorized to be paid on nickel, cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907). In March, 1912, the Act was amended to cover a further period of five years.

The sections affecting nickel ore are as follows:—

"The Treasurer of the Province may under the authority of such regulations as may from time to time be made in that behalf by the Lieutenant Governor in Council pay in each year to the refiners of the metals or metal compounds hereinafter specified when refined in the Province from ores raised and mined in the Province, a bounty on each pound of such metal or compound so refined as follows:"

"Class 1. On refined metallic nickel or on refined oxide of nickel, 6 cents per pound on the free metallic nickel or on the nickel contained in the nickel oxide, but nickel on which a bounty has already been paid in one form of product shall not be entitled to any further bounty in any other form, and the amount to be paid as bounty on the nickel products herein mentioned is not to exceed in all \$60,000 in any one year."

The full text of the Act will be found in the chapter on "Cobalt."

The price of refined nickel in New York during 1913 was quoted at 40 to 45 cents per pound for large lots on contract basis. During 1912 the price was the same.

Monel metal is finding an extended use in commerce; as this is put on the market at a price much lower than the final value of the metal content an allowance has been made by adopting a lower price per pound than market quotations.

Statistics of the quotations of nickel contained in matte produced, etc., will be found in the chapter on "Smelter Production."

Annual Production of Nickel.

Calendar Year.	Pounds of nickel in matte shipped.	Average price per lb.	Value.	Calendar Year	Pounds of nickel in matte shipped.	Average price per lb.	Value.
		Cts.	\$			Cts.	\$
1889...	*830,477	60	498,236	1902...	10,693,419	47	5,025,903
1890...	1,435,742	65	933,232	1903...	12,505,510	40	5,002,294
1891...	4,035,347	60	2,421,208	1901...	10,517,883	40	4,219,153
1892...	2,413,717	58	1,399,956	1905...	18,876,315	40	7,550,526
1893...	3,982,982	52	2,071,151	1906...	21,490,955	42	8,948,834
1894...	4,907,430	33½	1,870,958	1907...	21,189,793	45	9,535,407
1895...	3,888,525	35	1,360,981	1908...	19,143,111	43	8,231,538
1896...	3,397,113	35	1,188,990	1909...	26,282,991	36	9,461,877
1897...	3,997,617	35	1,399,176	1910...	37,271,033	39	11,181,310
1898...	5,517,610	33	1,820,833	1911...	34,098,744	30	10,229,623
1899...	5,714,000	36	2,067,840	1912...	44,811,542	30	13,452,462
1900...	7,080,227	47	3,327,707	1913...	49,676,772	30	14,903,013
1901...	9,189,017	50	4,594,523				

*Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are: The Canadian Copper Company (the International Nickel Company, Copper Cliff and New York), the Mond Nickel Company, Coniston, Ont., and

London, England. The latter Company is now operating its new smelter at Coniston in place of that at Victoria Mines.

Some prospecting and development work was done by the British America Nickel Corporation.

The Alexo mine on the Porcupine Branch of the Timiskaming and Northern Ontario Railway, produced during the year, shipping nickel-copper ore to the Mond smelter at Victoria Mines.

Reference has already been made to the occurrence of nickel as one of the minor constituents of the silver ores of the Cobalt district. The quantity of nickel contained in ores of this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore and concentrates shipped.	Nickel content (estimated.)
	Tons.	Tons.
1904.....	158	14
1905.....	2,144	75
1906.....	5,335	160
1907.....	14,788	370
1908.....	25,624	612
1909.....	30,677	766
1910.....	34,282	604
1911.....	26,653	392
1912.....	21,933	429
1913.....	20,877	377

A large portion of these ores were treated in the Ontario smelters, at Deloro, Thorold, Kingston, North Bay, and Welland. At several of these plants in addition to silver bullion and white arsenic, there is a recovery of the oxides of nickel and cobalt.

Statistics of the exports and imports of nickel as compiled by the Customs Department reports, are shown in the following tables:—

Exports of Nickel Contained in Ore, Matte, or Other Product.

Calendar Year.	Value.	Calendar Year.	Lbs.	Value.	Average price.
	\$			\$	Cts.
1890.....	89,568	1903.....	12,699,227	1,116,099	8.78
1891.....	667,280	1904.....	11,233,869	1,091,349	9.71
1892.....	293,149	1905.....	17,318,059	1,569,693	9.06
1893.....	629,692	1906.....	20,653,845	2,042,965	9.89
1894.....	559,356	1907.....	19,376,335	2,280,374	11.76
1895.....	521,783	1908.....	19,419,893	1,866,624	9.61
1896.....	653,213	1909.....	25,616,398	2,676,483	10.45
1897.....	723,130	1910.....	36,014,782	4,030,040	11.19
1898.....	1,019,363	1911.....	32,619,971	3,676,396	11.27
1899.....	939,915	1912.....	44,221,860	4,661,758	10.54
1900.....	1,031,030	1913.....	49,459,017	5,195,560	10.50
1901.....	751,080				
1902.....	1,007,211				

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Imports of Nickel and Nickel Anodes.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1890....	3,154	1898.....	5,882	1906.....	15,976
1891....	3,889	1899.....	9,419	1907.....	19,511
1892....	3,208	1900.....	6,988	1908.....	36,870
1893....	2,905	1901.....	12,029	1909.....	14,930
1894....	3,528	1902.....	15,448	1910.....	23,266
1895....	4,267	1903.....	26,177	1911.....	22,693
1896....	4,787	1904.....	14,682	1912.....	31,121
1897....	4,737	1905.....	19,076	1913.....	19,749

During the calendar year 1913 there was an import of nickel, nickel-silver, and German silver in ingots and bars to the extent of 42,726 pounds, valued at \$14,705, and nickel in bars and rods, 549,765 pounds, valued at \$147,815.

The only other important producer of nickel ore outside of Canada is the French colony, New Caledonia. The exports of nickel from this source since 1898 have been as follows in metric tons:—

Exports of Nickel Ore and Matte from New Caledonia.¹

Year.	Nickel ore. Metric tons.	Year.	Nickel ore. Metric tons.	Year.	Nickel ore. Metric tons.	Nickel matte. Metric tons.
1898.....	53,200	1903.....	77,360	1908.....	108,000	.....
1899.....	103,903	1904.....	98,655	1909.....	86,000	.....
1900.....	100,319	1905.....	125,289	1910.....	83,000	.....
1901.....	133,814	1906.....	118,890	1911.....	120,059	2,933
1902.....	129,653	1907.....	120,106	1912.....	72,315	5,097
				1913.....	93,103	5,892

¹Statistique de l'Industrie Minérale en France et en Algérie, Paris.

²For 1906 and following years, the figures represent production

³For 1911 and following years, statistics are taken from Mining Journal, London.

The following extract from the Mining Journal, London, May 16, 1914, may be of interest:—Referring to the mineral industry of New Caledonia, it says:—

“In 1913 the total value of ores and mattes exported reached £320,000. The average value per ton of nickel ore was 25s.; of chrome ore 25s.; and of nickel mattes £24. The shipment of nickel ores is in the hands of four companies, viz.: Le Nickel, 51,306 tons; Hautes-Fourneaux 27,016; Béchade 9,111; and Mont-Dô 5,675 tons. The nickel mattes shipped were treated

in the works of the following companies: Hautes-Fourneaux 3,467; Le Nickel 2,314, and Usines de Tao 111 tons."

"The percentage of nickel in the ores exported was 6.25 to 6.30 per cent, whilst that of the nickel mattes varied between 43 and 45 per cent, except that of the Usines de Tao which reached 50 per cent. The fine metal contained in the mattes was about 2,563 tons extracted from 64,000 tons of ore. Consequently the total quantity of nickel ores raised in 1913 attained 157,000 tons, an increase over the preceding year of 46,000.

The production of raw nickel at smelting works (partly estimated is given by the Metallgesellschaft as follows, in metric tons:—

Production of Raw Nickel at Smelting Works, in Metric Tons.

Producing country.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
United States of North America and Canada.....	4,500	6,500	6,500	7,000	9,000	10,000	12,000	15,000	.....
England.....	3,100	3,200	3,200	3,000	3,200	3,500	4,500	5,200	.....
Germany*.....	2,700	2,800	2,600	3,000	3,500	4,500	5,000	5,000	.....
France.....	2,200	1,800	1,800	1,400	1,200	1,500	2,000	2,100	.....
Other countries.....	.....	.....	.....	200	400	600	1,000	1,200	.....
Total production†.....	12,500	14,300	14,100	14,600	17,300	20,100	24,500	28,500	30,000

*The figures of production stated for Germany only cover the output in the Kingdom of Prussia; nickel is also produced in the Kingdom of Saxony, but no data are obtainable of this production which is, however, not important.

†The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonia and Canadian ores.

Statistics of the average yearly prices in Europe, as given by the same authority, are as follows:—

Yearly Average Prices of Nickel in Europe in Cents per Pound, and Marks per Kilogram.

Year.	Prices in marks per kilo.	Cents per lb.	Year.	Prices in marks per kilo.	Cents per lb.
1889.....	4.50	48.6	1901.....	3.00	32.4
1890.....	4.50	48.6	1902.....	3.20	34.6
1891.....	4.50	48.6	1903.....	3.30	35.6
1892.....	4.50	48.6	1904.....	3.30	35.6
1893.....	3.50	41.0	1905.....	3.30	35.6
1894.....	3.60	38.9	1906.....	3.50	41.0
1895.....	2.60	28.1	1907.....	3.50	37.8
1896.....	2.50	27.0	1908.....	3.25	35.2
1897.....	2.50	27.0	1909.....	3.25	35.2
1898.....	2.50	27.0	1910.....	3.25	35.2
1899.....	2.50	27.0	1911.....	3.25	35.2
1900.....	3.00	32.4	1912.....	3.25	35.2
			1913.....	3.25	35.2

PLATINUM AND PALLADIUM.

In past years the chief source of the platinum production of Canada was the placer gravels of British Columbia, principally in the Similkameen district. During 1913 operators in the Cariboo district of British Columbia report a recovery of 18 crude ounces of platinum valued at \$489. More attention is being paid to the recovery of this metal especially in the Similkameen where it is proposed to re-work some of the old placers.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and since 1902 considerable quantities of these metals have been recovered from the residues resulting from the treatment of the mattes from Sudbury.

Since 1906 no record of the recovery of metals of the platinum group from the Sudbury District ores has been published, but the International Nickel Company have been good enough to inform us that the recovery of gold, silver, platinum, and palladium at their works in New Jersey for the six years ending December 31, 1912, was as follows:—

Year.	Gold.	Silver.	Platinum.	Palladium.
	Ozs.	Ozs.	Ozs.	Ozs.
1907.....	993.572	63,400.70	226.800	907.300
1908.....	5,238.181	139,329.29	172.316	382.287
1909.....	2,113.669	63,138.66	546.627	1,270.598
1910.....	2,649.799	60,256.83	258.325	522.804
1911.....	2,203.052	70,954.34	665.552	753.363
1912.....	2,476.558	62,169.66	496.850	680.130
	15,674.831	459,249.52	2,396.470	4,216.482

In view, however, of the fact that other material has been treated in the Company's works in addition to the nickel-copper mattes from Copper Cliff, Ontario, it is impossible to state what proportion of the above recoveries was from Canadian sources, although it is, of course, safe to assume that part of these metals has been derived from the Sudbury District mattes.

Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Crude Oz.	Value.
	\$		\$			\$
1887	5,600	1891	950	1901		457
1888	6,000	1895	3,800	1902		46,502
1889	3,500	1896	750	1903		33,315
1890	4,500	1897	1,600	1904		10,872
1891	10,000	1898	1,500	1905		500
1892	3,500	1899	825	1906		..
1893	1,800	1900	Nil.	1907-1912		..
				1913	18	489

*See under Palladium.

**See explanation in text.

Annual Production of Palladium.

	Ozs.	Value.
1902 Palladium...	4,411	\$ 86,014
1903 "	3,177	61,952
1904 "	952	18,561
1905 Metals of the platinum group.....	1,582	28,116
1906 "	314	5,652
1907-1912		
1913		

*See explanation in text.

Imports of Platinum.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year	Value.
	\$		\$		\$
1883	113	1893	14,082	1903	21,251
1884	576	1894	7,151	1904	28,112
1885	792	1895	3,937	1905	61,719
1886	1,154	1896	6,185	1906	54,494
1887	1,422	1897	9,031	1907 (0 mos.).....	113,485
1888	13,475	1898	9,781	1908	60,390
1889	3,167	1899	9,671	1909	45,534
1890	5,215	1900	57,910	1910	84,435
1891	4,055	1901	20,263	1911	137,241
1892	1,952	1902	19,357	1912	191,370
				1913*	221,321

*Platinum wire and platinum in bars, strips, sheets or plates; platinum retorts, pans, condensers, tubing and pipe, imported by manufacturers of sulphuric acid for use in their works; crucibles. Duty free.

SILVER.

Silver, due to the development of the Cobalt camp in Ontario, has risen to second place in point of total value of output in our list of mineral products, coal being first.

In 1913 the total production of silver, including that produced as bullion, and the metal estimated as recovered from ores sent to smelters or otherwise treated, was 31,845,803 fine ounces, compared with a production of 31,955,560 ounces in 1912, a decrease of 109,757 ounces.

The average value of fine silver in 1913 was, however, according to New York quotations, 59.791 cents per ounce, as compared with an average value of 60.835 cents in 1912, a decrease of 1.71 per cent.

The total value of the silver production in 1913 was \$19,040,924, a decrease of 2.05 per cent from the value, \$19,449,165, in 1912.

A comparison of 1912 and 1911 shows a decrease for 1912 of 603,484 ounces, or 1.85 per cent in quantity, and an increase of \$2,084,893, or 14.13 per cent in value.

Statistics of the annual production of silver since 1887 are given in the following table:—

Annual Production of Silver 1887-1913.

Year.	Ozs.	Value.	Average price per oz.	Year.	Ozs.	Value.	Average price per oz.
		\$	Cts.			\$	Cts.
1887.....	355,083	347,271	98.00	1900.....	4,468,500	2,740,362	61.33
1888.....	437,232	410,998	91.00	1901.....	5,539,000	3,265,351	58.95
1889.....	383,318	358,785	93.60	1902.....	4,291,000	2,238,351	52.16
1890.....	400,687	419,118	104.60	1903.....	3,198,581	1,709,642	53.45
1891.....	414,523	409,549	98.00	1904.....	3,577,526	2,047,095	57.22
1892.....	319,651	272,130	86.00	1905.....	6,000,023	3,621,133	60.35
1893.....		330,128	77.00	1906.....	8,473,379	5,059,455	60.79
1894.....	847,697	534,049	63.00	1907.....	12,779,799	8,318,659	65.33
1895.....	1,578,275	1,030,299	65.28	1908.....	22,106,233	11,080,239	52.86
1896.....	3,205,343	2,140,503	67.06	1909.....	27,529,473	14,178,501	51.50
1897.....	5,558,450	3,323,395	59.79	1910.....	32,869,264	17,580,455	53.49
1898.....	4,452,333	2,593,929	58.26	1911.....	32,559,011	17,355,272	53.30
1899.....	3,411,644	2,032,648	59.58	1912.....	31,955,560	19,449,165	60.83
				1913.....	31,845,803	19,040,924	59.79

From 1887 to 1893 the production ranged in value between \$300,000 and \$400,000, and was derived chiefly from Ontario and Quebec. The next three years saw a rapid increase in production, due to the development of the silver-lead deposits of British Columbia, and in 1896 a pro-

duction of over \$2,000,000 is recorded. From that year until 1905 the production varied between \$2,000,000 and \$3,500,000, rising rapidly during the next six years to \$17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt. Since then there has been a falling-off in quantity, but owing to the higher price of the metal the total value has been higher, that recorded in 1912 being \$10,440,165, while 1913 was \$10,040,924.

Ontario in 1905 produced 40.9 per cent of the output of Canada, in 1911 the percentage was 93.8, while in 1913 its percentage was 89.2, with British Columbia next with 10.4 per cent. Statistics of the annual production in each province are shown in the table following:—

Production of Silver by Provinces, 1887-1913.

Calendar Year.	ONTARIO.		QUEBEC.		BRITISH COLUMBIA.		YUKON TERRITORY.	
	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.	Ozs.	Value.
		\$		\$		\$		\$
1887	190,495	186,304	146,898	143,666	17,690	17,301		
1888	208,064	195,580	149,388	140,425	79,780	71,993		
1889	181,609	169,986	148,517	150,012	53,192	49,787		
1890	158,715	166,016	171,545	179,436	70,427	71,666		
1891	225,633	222,926	185,584	183,357	3,306	3,206		
1892	41,581	38,425	191,910	163,113	77,160	67,592		
1893		8,639		126,439		195,000		
1894			101,318	63,830	716,379	470,219		
1895			81,753	53,369	1,496,522	976,930		
1896			70,000	46,942	3,135,313	2,102,591		
1897	5,000	2,900	80,475	48,116	5,472,971	3,272,289		
1898	85,009	49,521	71,932	43,655	4,292,401	2,500,753		
1899	202,000	120,352	40,231	23,970	2,939,411	1,751,302	230,000	137,031
1900	161,659	99,140	58,409	35,817	3,958,175	2,427,518	290,000	177,857
1901	151,400	89,250	41,459	24,440	5,151,331	3,036,711	195,000	111,953
1902	145,000	75,632	42,500	22,168	3,917,917	2,043,586	185,900	96,985
1903	17,777	9,502	28,600	15,287	2,996,201	1,601,471	156,000	83,562
1904	209,875	118,376	15,090	8,583	3,222,481	1,813,935	133,170	76,201
1905	2,451,356	1,479,442	19,620	11,811	3,439,417	2,075,757	89,630	51,093
1906	5,401,766	3,607,891	17,686	11,813	2,990,262	1,997,226	61,665	42,522
1907	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908	19,398,545	10,254,817	13,299	7,030	2,651,389	1,391,058	63,000	31,401
1909	21,822,099	12,781,126	13,233	6,815	2,619,141	1,361,337	45,000	23,176
1910	30,366,366	16,241,755	7,593	4,091	2,407,887	1,287,883	87,418	46,756
1911	39,540,751	16,279,443	18,435	9,827	1,887,147	1,005,924	112,708	60,078
1912	29,211,025	17,772,352	9,465	5,758	2,651,002	1,612,737	81,068	49,318
1913	28,411,261	16,987,377	31,573	20,672	3,312,341	1,980,483	87,626	52,392

The average weekly price of fine silver in New York during 1913 varied between 63 $\frac{3}{4}$ cents per ounce in January and a minimum of 56 $\frac{3}{4}$ cents in March, the average monthly price for the year being 59.791 cents per ounce.

In London the average monthly price of silver in 1913 was 27.576 pence per standard ounce 0.925 fine. For the year 1912 the average monthly price per fine ounce in New York was 60.835 cents.

The average monthly prices of silver in New York from 1909 to 1913, and in London during 1913, are shown in tabulated form following:—

Average Monthly Prices of Silver.

Months.	New York. Cents per fine ounce.					London.— Pence per Standard ounce(a).
	1909	1910	1911	1912	1913	1913
January			53.795	56.260	62.038	28.983
February			52.222	59.043	61.612	28.357
March		51.454	52.745	58.375	57.870	26.669
April		53.221	53.325	59.207	59.490	27.410
May		53.870	53.308	60.880	60.361	27.825
June		51.482	53.013	61.200	58.900	27.109
July		51.150	52.630	60.651	58.721	27.074
August		52.912	52.171	61.600	59.203	27.355
September	51.410	53.295	52.440	63.078	60.010	27.986
October	50.923	55.490	53.340	61.471	60.793	28.083
November	50.701	55.635	55.719	62.792	58.995	27.263
December	52.226	54.428	54.905	63.365	57.760	26.720
Average for the year	51.503	53.486	53.301	60.835	59.791	27.576

(a) 925 parts fine.

Important quantities of silver are being produced in Canada, both as fine metal and as silver bullion ranging in fineness from 850 to 998.2. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, being derived chiefly from the silver-lead ores of that Province, and finds a market in Canada, the United States, and China.

The annual production of fine silver at Trail since 1904 has been as follows:—

Year.	Fine ozs.	Year.	Fine ozs.
1901	551,450	1910	1,798,960
1905	1,088,328	1911	1,125,601
1906	1,263,809	1912	1,896,999
1907	1,631,422	1913	2,433,002
1908	1,956,039		
1909	2,003,003	Total	15,948,613

In Ontario ores from the Cobalt district are treated by:—

The Comiagas Reduction Co., Thorold, Ont.

The Deloro Mining and Reduction Co., Deloro, Ont.

The Buffalo and Ontario Smelting and Refining Co., Kingston,
Ont.

Dominion Refineries Limited, North Bay, Ont.

Metals Chemical Co., Welland, Ont.

Silver bullion of a fineness varying from 850 to 998.2 is produced at the works, other products being white arsenic, nickel and cobalt oxides and mixed oxides. The silver bullion as a rule finds a market in the United States and in England.

Bullion shipped by these Ontario smelters in 1907 contained 1,419,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1911, 17,753,167 ounces; and in 1913, 11,356,707 fine ounces. The decrease is accounted for by the treatment of the greater part of the high grade ore in the camp itself.

United States smelters report the receipt of 19,792,317 pounds of ore containing 4,889,980 ounces of silver, and 1,254 ounces of gold. The latter metal would indicate the inclusion of a shipment from Porcupine, or Kirkland Lake, but the major part of the ore is from Cobalt.

Quebec.

The small quantity of silver credited to Quebec province for a number of years represents a small silver content of the pyritic ores mined at Eustis and Weedon, in the Eastern Townships.

Ontario.

From a production of \$118,376, in 1904, the silver output of the Province has grown to \$17,772,352 in 1912. In 1913 there is a slight decrease in both quantity and value, the amounts being 28,411,261 ounces, valued at \$16,987,377. This constitutes 89.2 per cent of the production of Canada, which country, as a whole, now ranks third as a silver producer.

According to returns received by this Department, there were shipped from the mines 29,741 tons of ore and 10,838 tons of concentrates having a total value of \$12,565,718, besides silver bullion containing 7,599,929 ounces of silver.

A good deal of this ore was milled within the district and shipped as bullion, consequently there is a difference between mine shipments as here given and district shipments.

The silver content of ore shipped was estimated at 13,601,286 ounces, or an average of 457 ounces per ton, and the concentrates shipped as 8,260,888 ounces, an average of 762 ounces per ton, the total silver content of ore, concentrates and bullion shipped from the Cobalt District mines

being 29,462,103 ounces. The mine owners receive payment for only 93 to 98 per cent of the silver content, and in estimating and valuing the production a deduction of 5 per cent is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 28,368,994 ounces, valued at \$16,962,105.

Payments for cobalt content were made only in the case of the residues from the Nipissing high grade mill, and the Timiskaming mine also received returns from a small copper content in some of its shipments.

In the following table a record of shipments since 1904 is given, the figures of the first three years being those published by the Ontario Bureau of Mines.

Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1913.

Year.	SHIPMENTS.		SILVER CONTENT.		SILVER IN OUNCES. PER TON.		Silver bullion ship- ments. Fine ounces.	Total value of silver.
	Ore. Tons.	Con- centrate. Tons.	Ore. Ozs.	Concen- trate. Ozs.	Ore.	Con- centrate.		
								\$
1904	158		206,875		1,309			118,376
1905	2,144		2,451,350		1,143			1,473,192
1906	5,335		5,401,766		1,013			3,607,894
1907	14,644		9,982,363		662			6,521,178
1908	25,682		19,398,545		755	*		10,254,847
1909	27,835	3,059	22,349,717	3,627,819	803	1,186	143,440	12,784,126
1910	28,684	6,943	23,797,111	7,111,579	830	1,024	1,003,111	16,241,755
1911	15,417	9,329	20,065,621	8,118,231	1,300	870	3,766,022	16,279,443
1912	17,899	11,217	15,929,289	9,774,697	890	871	4,778,852	17,762,384
1913	29,741	10,838	13,601,286	8,260,888	457	762	7,599,929	16,962,105

*Included in ore.

As the camp has developed, the average grade of ore shipped has gradually diminished. The introduction of concentration plants in 1908 has tended to keep the shipments up to a high standard, but there is a growing tendency to treat the ore at the mines and convert it into bullion for shipment.

The total metal content of these ores as estimated by the Ontario Bureau of Mines is shown in the next table. The figures for ore shipments and silver contents while not identical, agree very closely with those given in the previous table.

Total Production Cobalt Mines, 1904-1913.*

Year.	ORE AND CON- CENTRATE SHIPPED.	METALLIC CONTENT.			
		Nickel.	Cobalt.	Arsenic.	Silver.
	Tons.	Tons.	Tons.	Tons.	Ozs.
1904.....	158	14	16	72	206,875
1905.....	2,144	75	118	519	2,451,356
1906.....	5,335	160	321	1,440	5,401,766
1907.....	14,788	370	739	2,958	10,023,311
1908.....	25,624	612	1,221	3,672	19,437,875
1909.....	30,677	766	1,533	4,291	25,897,825
1910.....	34,282	604	1,098	4,897	†30,645,181
1911.....	26,653	392	852	3,806	†31,507,791
1912.....	21,933	429	934	4,166	†30,243,859
1913.....	20,877	377	821	3,663	†29,691,975

*As per Ontario Bureau of Mines.

†Bullion shipments from mines included.

While the greater number of the mining companies, hold unrestricted titles to their properties, several are operated on a royalty basis of mining lands owned and leased by the Timiskaming and Northern Ontario Railway Commission. Mr. A. A. Cole, Mining Engineer to the Commission has in his annual report some interesting statistics from which the following tables and extracts have been drawn:—

Ore Shipments from the Cobalt District for the Years 1904 to 1913.

Mine.	1904. to 1908.	1909.	1910.	1911.	1912.	1913.	Totals. 1904-1913.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Badger.....				27-10			27-10
Bailey.....	118-80	36-85		20-00	41-57	150-35	367-57
Beaver.....		51-38	140-06	790-81	402-97	292-21	1,677-43
Buffalo.....	2,972-01	648-86	1,185-77	1,275-19	1,251-64	86-13	7,399-63
Casey-Cobalt.....	10-00	8-50	48-40	277-74	214-34	401-54	960-52
Chambers-Ferland.....	223-89	517-88	885-92	622-85	501-29	223-78	2,975-61
City of Cobalt.....	811-65	566-82	329-40	281-30	230-00	105-14	2,324-31
Cobalt Lake.....	225-97	95-47	296-80	2,111-32	1,085-22	1,196-33	5,011-11
Cobalt Townsite.....	320-93	27-35	310-99	703-51	1,944-77	2,762-54	6,070-09
Colonial.....	55-38		178-60	114-10	86-48	21-56	456-12
Contagas.....	3,510-24	806-93	1,261-46	1,813-89	2,119-87	1,620-40	11,132-79
Crown Reserve.....	657-35	3,167-52	2,814-25	977-32	561-65	791-15	8,969-24
Drummond.....	1,572-86	1,225-47	2,194-41	711-83	458-85	610-06	6,776-48
Foster.....	704-18	113-90					818-08
Green Meehan.....	135-42			102-98		12-96	251-36
Hargrave.....	28-45		343-68	102-44	17-35		491-92
Hudson Bay.....	1,243-76	743-64	260-33	898-88	694-55	609-14	4,450-30
Imperial Cobalt.....	11-61						14-61
Kerr Lake.....	1,193-30	1,173-42	5,088-78	1,292-58	788-10	933-35	10,469-53
King Edward (Watts)	388-31	146-58	134-12	20-00		87-21	776-22
LaRose.....	9,181-14	6,757-21	5,131-53	3,581-51	3,511-40	3,275-14	31,437-96
Lawson.....	75-73						75-73
Lost and Found.....					65-20	8-80	74-00
Lumsden.....						20-00	20-00
McKinley-Darragh.....	3,098-35	1,056-49	2,393-39	3,238-64	2,673-40	2,865-66	15,325-93
Nancy Helen.....	231-42	116-32					347-74
Nipissing.....	8,778-32	0,470-52	6,833-81	2,952-20	1,869-27	1,950-22	28,854-34
Nova Scotia.....	554-11	224-79					778-90
North Cobalt.....		6-87		3-00			9-87
O'Brien.....	5,091-62	1,419-11	608-57	628-44	711-43	703-43	9,162-60
*Penn Canadian.....	265-32	339-01	285-62	22-40	126-35	332-18	1,370-88
Peterson Lake Leases						9-00	9-00
Gould.....							422-50
(Little Nipissing).....	40-67	39-62	313-76	28-45			121-15
(Nova Scotia).....		121-15			432-97	457-93	890-90
Seneca Superior.....					22-22		250-65
Provincial.....	75-84		52-05	100-54			3-93
†Princess.....	3-93						45-71
Red Rock.....	45-71						4,571-48
Right of Way.....	925-66	1,608-99	981-41	666-00	243-24	146-12	28-30
Rochester.....			28-30				23-30
Silver Bar.....	0-58			2-72		20-00	23-30
Silver Cliff.....	160-44	149-06	156-84	92-30		48-05	606-69
Silver Leaf.....	252-39						252-39
Silver Queen.....	1,539-94	316-64			31-25	201-98	2,089-81
Timi-kaming.....	999-52	852-14	1,119-12	855-60	967-31	406-26	5,199-95
Timi-kaming-Cobalt.....	88-45						88-45
Trethewey.....	2,680-33	1,134-50	536-64	602-98	579-10	587-54	0,121-09
†University.....	231-51						231-51
Victoria.....	0-47						0-47
Violet.....	36-90						36-00
Waldman.....			38-81				38-81
Wynndoh.....			24-15				24-15
Total.....	48,544-50	29,942-99	33,676-97	24,921-71	21,631-79	20,916-16	179,934-21

†The shipment in 1905 was made by the White Silver Mining Co., the former owner of the Hargrave property.

‡Shipments from Lawson, Princess, and University, since 1907, included La Rose.

*Shipments up to the end of 1911 made by the Cobalt Central Mining Company former owner of the Penn Canadian.

MILLING.

"Milling this year becomes a still more important feature in the work of the Cobalt mines. The tonnage of low grade ore treated during the year shows an increase of 46 per cent over the previous year."

"The only new mill coming into operation was that of the Northern Customs. It is situated at mileage 104 north of the LaRose mine and one mile north of Cobalt. It started operations a few days before the end of the year and in that time treated 1,158 tons of LaRose ore."

Mills and mines.	Tons milled.	CONCENTRATES.			Concentration ratio.
		Jigs.	Tables.	Total.	
Beaver.....	24,334	113.0	197.3	310.3	78-1
Buffalo.....	71,042			1,227.3	58-1
Casey-Cobalt.....	9,949	18.2	252.6	270.8	37-1
Cobalt Lake.....	37,016	239.6	790.9	1,030.5	37-1
Cobalt Reduction—					
LaRose.....	5,452		147.0	147.0	37-1
Townsite.....	8,829	3.0	155.1	158.1	50-1
Colonial.....	1,500		22.0	22.0	68-1
Right of Way.....	5,013		84.8	84.8	59-1
Coniagas.....	55,283	201.0	710.0	911.0	61-1
Hudson Bay.....	22,639	154.4	568.1	722.5	31-1
King Edward.....	1,975	1.5	66.5	68.0	29-1
McKinley-Darragh.....	63,057	183.0	1,848.0	2,031.0	31-1
Nipissing Reduction—					
Silver Queen.....	15,674	343.7	113.3	457.0	34-1
Northern Customs—					
Comet (Drummond).....	11,291	11.8	503.0	514.8	22-1
LaRose.....	38,714		1,012.4	1,012.4	38-1
Townsite.....	31,545	29.5	431.3	460.8	68-1
O'Brien.....	40,036	114.0	269.0	383.0	105-1
Penn Canadian.....	16,648	109.9	189.4	299.3	56-1
Bailey.....	3,156	33.5	50.3	83.8	38-1
Comet (Drummond).....	194	0.7	5.5	6.2	31-1
Timiskaming.....	32,307	107.4	409.3	516.7	63-1
Trethewey.....	35,294	100.0	484.4	584.4	60-1
Total.....	531,548			11,301.7	47-1

Cyanide mills.	Tons.	Ozs. bullion produced.
Dominion Reduction.....		
Comet (Drummond).....		3,928
Crown Reserve.....		29,548
Hargrave.....		157
Kerr Lake.....		22,471
Seneca Superior.....		60
Nipissing, Low Grade.....		77,133
	133,297	1,981,371

Total tons milled by water concentrating mills..... 531,548

Total tons milled by cyanide mills..... 133,297

Total tons milled, 1913..... 664,845

SMELTING.

"The market for Cobalt silver ores has been more restricted this year than previously and at times it has been difficult to dispose of stocks on hand particularly if running high in arsenic. In the autumn of 1912 the Canadian Copper Company decided to close up and abandon its Cobalt plant and since that time has accepted no Cobalt ores. The market was further restricted by the withdrawal of the Canada Smelting and Refining Company on account of a fire which put its works out of commission early in January 1913. This Company has since been repairing the damage done by the fire and is now cleaning up the residues at the plant, no new ore is to be accepted till these residues are disposed of."

Practically all of the ores from the Cobalt district treated in Canada were taken by:

1. Coniagas Reduction Company, Thorold Ont.
2. Deloro Mining and Reduction Company, Deloro, Ont.

"Most of the foreign shipments went to the United States. A few were shipped to the Saxon Government by the Crown Reserve Mining Co. Regular shipments of cobalt-nickel residues from the Nipissing high grade mill were made by the Nipissing Mining Company to H. Wiggins & Co., of Birmingham, England. In this case payment was made for the cobalt contents as well as the silver. The American Smelting and Refining Company took most of the shipments going to the United States though occasional shipments were also accepted by the Pennsylvania Smelting Company, Carnegie, Pa., the Balbach Smelting and Refining Company, Newark, N.J. and the United States Metals Refining Company, Chrome, N.J."

A number of the shipping mines of Cobalt have published annual reports containing some details of their operations from which the following extracts have been taken:—

Beaver Consolidated Mines, Limited.

Year ended February 28, 1914.

"*Mill*:—During the first half of the year the mill treated nearly 80 tons a day. We replaced our four foot Hardinge ball mill by a six foot Hardinge ball mill and since that time have been milling up to 100 tons a day. Our average for the year was 86 tons. We herewith submit a condensed report of the mill for the year during which it operated 293½ days.

"Ore milled.....	25,256 tons.
Concentrates produced.....	324.13 "
Silver in concentrates.....	379,764.5 ozs.
Earnings less milling and marketing costs.	\$168,630.63.

*"Silver Production:—*During the year we shipped 762,698·9 ounces of silver valued at \$438,551.88 (average price of silver 57½ cents an ounce), as against 689,921 ounces shipped in the previous year valued at \$409,211.93 (average price of silver 59·3 cents an ounce)."

The Buffalo Mines Limited.

Year ending April 30, 1914.

"Shipments:—

*"Ore and concentrates.—*During the year two cars were shipped containing 57 tons of table concentrates, the smelter returns of which amounted to 81,607 ounces, of which 9,194 ounces were of this year's production. There were also several small sales of native silver amounting to 175 ounces.

*Bullion.—*There were also shipped during the year 115,575 pounds or 57¾ tons of refined bullion, the returns of which amounted to 1,484,231 ounces. Total returns for shipments and sales of this year's production amounted to 1,493,600 ounces."

The Coniagas Mines, Limited.

Year ending October, 31, 1913.

"The total tonnage of ore milled was 54,890 or an average of 2·95 tons per stamp per 24 hours as compared with 53,627 tons averaging 2·86 tons per stamp for previous year."

"There were 6·11 tons high grade concentrates shipped and 423 tons low grade slimes the former averaging 2,094 ounces per ton and the latter 103 ounces per ton, the heads of the mill averaging 28·3 ounces per ton as compared with 34·12 for the previous year. The sand tailings from mill averaged 3·52 ounces per ton and slime tailings 6·13; the average of general tails was 4·23 ounces."

"There was a total of 736 tons mine ore shipped which averaged 3,057 ounces per ton."

Crown Reserve Mining Company, Limited.

Year ending Dec. 31, 1913.

SHIPMENTS.

	Net weight.	Ounces silver.	Gross value.	Cost of treatment.	Net value.
	Tons.		\$	\$	\$
High grade.....	312.63	1,138,896	671,571.34	12,457.41	659,113.93
Bullion.....	4.10	112,470	67,135.67	449.47	66,686.20
	316.73	1,251,366	738,707.01	12,906.88	725,800.13
Milled ore, shipped as bullion.....	19.10	525,312	317,564.85	3,247.00	314,317.85
	335.83	1,776,678	1,056,271.86	16,153.88	1,040,117.98

"Lake Drainage.—Permission having been granted on May 1st, 1913, by the Mining Commission of Ontario to the Crown Reserve Mining Company, Limited, and the Kerr Lake Mining Company, Limited, jointly to pump out the water and mud from the bed of Kerr Lake, construction work was immediately begun".

Kerr Lake Mining Company, Limited.

Ore Production for the Year ending Aug. 31, 1913.

Grade of ore.	Net weight.	Silver content.	Average silver content per ton.
	Lbs.	Ozs.	Ozs.
1st Class.....	768,398	1,287,035	3347.00
2nd ".....	323,030	72,783	450.60
Jig and table concentrates.....	383,020	183,082	959.10
Bullion from metallics.....	18,252.3	31,834	29.29
Mill ore.....	(tons)	534,641	
		2,109,975	

August estimated in part.

LaRose Consolidated Mines Company.

Year ended Dec. 31, 1913.

SHIPMENTS.

	Dry tons.	Net value per ton.	Ounces silver.	Net value.	Per cent of total.
		\$		\$	
Silver, cobalt, Nickel ore.....	1,275,822	827.00	1,914,741.20	1,055,110.94	75.7
Low grade Siliceous ore.....	1,076,529	43.33	121,168.54	46,645.00	3.4
Nuggets.....	6,120	13,441.54	133,667.70	82,262.23	5.9
Concentrates.....	915,918	228.74	418,198.40	209,595.60	15.0
	3,274,389	425.58	2,592,775.88	1,393,523.77	100.0

McKinley-Darragh-Savage Mines of Cobalt, Limited.

Year ended Dec. 31, 1913.

Total ounces of silver recovered:—

McKinley 1,647,880; Savage 566,156—Total 2,214,036.

OUNCES OF SILVER SHIPPED TO DATE:

	1906.	1907.	1908.	1909.	1910.	1911.
McKinley.....	42,673	632,983	720,779	1,265,300	2,213,238	1,964,783
Savage.....			17,433	59,404	408,650	604,871
Total.....	42,673	632,983	738,212	1,324,704	2,621,888	2,569,654
	1912.	1913.	Total to January 1, 1914.			
McKinley.....	2,075,326	1,672,431	10,587,513			
Savage.....	629,542	556,066	2,275,966			
Total.....	2,704,868	2,228,497	12,863,479			

Nipissing Mines Company.

Year ending Dec. 31, 1913.

Summary of shipments, 1913.

Nipissing Production only.—

Dry tons shipped.....	1,328,625
Gross ounces of silver contained.....	4,844,169.41
Gross silver value.....	\$ 2,919,143.93
Average price received per ounce, cents.....	60.261
Received from sales of cobalt and nickel.....	\$ 26,183.38
Gross silver, cobalt and nickel value.....	\$ 2,945,327.31
Marketing charges.....	\$ 24,621.04
Net value received from sales.....	\$ 2,920,706.27

“The residue from the high grade mill carries twenty to forty ounces of silver, 8% to 10% cobalt, 4% to 6% nickel, and 30% to 40% arsenic. This is sold to the manufacturers of cobalt products and during the year shipments of 1,659 tons were made which netted the Company \$62,484.”

Peterson Lake Silver Cobalt Mining Company, Limited.

Year ending April 30, 1914.

“*Ore Production.*—The Seneca Superior Lease produced during the year 1,406,772.29 ounces of silver paid for by the smelter having an estimated value of \$828,578.31 of which the Peterson Lake Company estimate \$207,144.57 in royalty will be received.”

“The Gould lease has produced 59,016.42 ounces of silver paid for by the smelter valued at \$34,298.80. The Peterson Lake royalty from this was \$8,574.72.”

“We have produced from Number Two shaft, twenty-five tons of ore which is ready for shipment. We estimate this at 1,300 ounces per ton.”

Right of Way Mines, Limited.

Year ending Dec. 31, 1913.

ORE SHIPMENTS.

	Dry weight in pounds.	Silver content.	Gross value.	Net value.
		Ozs.		
First Grade.....	86,685	53,159.7	\$31,377.60	\$28,416.61
Second “.....	62,204	2,507.0	1,484.57	868.23
Concentrates.....	139,645	44,359.3	25,288.53	22,246.16
Total.....	288,534	100,026.0	\$58,150.70	\$51,531.00

Trethewey Silver-Cobalt Mines, Limited.

Year ending Dec. 31, 1913.

SHIPMENTS IN 1913.

	Net dry weight. Tons.	Ave. assay silver Oz. per ton.	Total silver contents.	Gross value.	Net smelter returns.
To Deloro Mg. & R. Co.	314.3475	1,669.5	524,799.33	\$310,515.20	\$289,713.38
To A.S. & R. Co., Denver.	272.8675	234.4	63,962.27	38,158.76	30,340.66
To London (Bullion).....			10,273.81	6,166.89	6,085.52
Total.....	587.2150		599,035.41	\$354,840.85	\$326,139.56

Wetlaufer Lorrain Silver Mines, Limited.

Year ending Dec. 31, 1913.

SHIPMENTS.

	Pounds.	Ounces silver.	Net value.
First Class.....	84,000	147,425.26	\$83,784.76
Second ".....	60,000	11,417.87	5,605.87
Concentrates.....	120,000	72,965.57	38,612.30
Bullion.....	1,941	17,182.05	10,071.43
Total.....	265,941	248,990.75	\$138,074.36

British Columbia.

The chief sources of the silver production in this Province are the silver-lead ores of the East and West Kootenays, supplemented by the silver contained in the gold-copper ores of Rossland, the Boundary, and Coast districts. The production in 1913, based on smelter recoveries, was 3,312,343 ounces, valued at \$1,980,483.

The leading silver producers of the Province in order of importance were: The Standard, Sullivan, Rambler-Cariboo, Number One, Vancouver and Blue Bell.

The Granby mines at Phoenix, on account of their large tonnage of copper ores, come second, with the others maintaining their respective places.

During 1913 the Sandon and Silverton and adjoining camps were very active. Much interest also centres in the Ainsworth camp, where the Consolidated Mining and Smelting Company reopened the Highland,

Number One and Maestro, with important results. The Silver Hoard also shipped a considerable tonnage and the Blue Bell, though its ore is low in silver, ranks high as a silver producer on account of its heavy tonnage.

Production of Silver in British Columbia by Districts, 1909-1913.*

	1909.	1910.	1911.	1912.	1913.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Cariboo—					46,298
Omineca	4,569	1,454	29,976	5,868	4,714
Cassiar.....					362,311
Kootenay, East—	580,240	501,475	330,235	376,918	4,750
Fort Steele division.....	825	243		7,405	
Other divisions.....					
Kootenay, West—					447,015
Ainsworth division.....	352,553	233,010	77,375	301,755	129,011
Nelson division.....	75,903	45,787	70,774	164,182	1,841,226
Slocan division.....	738,175	964,634	793,926	1,657,105	109,585
Trail Creek division.....	80,026	87,833	88,076	87,530	23,307
Other divisions.....	189,435	107,753	67,884	43,536	
Yale—					394,048
Boundary.....	492,333	460,945	326,849	389,341	461
Yale.....		3	343		103,034
Coast and other districts.....	38,676	47,104	100,920	98,463	
Total.....	2,532,742	2,450,241	1,892,364	3,132,108	3,465,856

*From the Minister of Mines Reports, British Columbia.

Yukon.

The figures of the silver production of the Yukon given in the second table of this article represent the silver alloyed with the placer gold, together with a small amount from the lode mines of the district. On an average about one ounce of silver is contained in each five ounces of crude bullion from the alluvial workings.

The production may be given as follows:—

	Placer	Value.	Lode	Value.	Total	Value.
	Ozs.		Ozs.		Ozs.	
		\$		\$		\$
1909.....	45,000	23,176			45,000	23,176
1910.....	50,000	26,743	37,418	20,013	87,418	46,756
1911.....	50,300	26,812	62,408	33,206	112,708	60,078
1912.....	60,302	36,683	20,766	12,633	81,068	49,318
1913.....	63,522	37,980	24,104	14,412	87,626	52,392

Exports.

The following table shows the statistics of silver contained in ore matte or other form exported from Canada since 1886 as compiled from the reports of Trade and Navigation, published by the Customs Department. The exports during 1913 were 37,371,560 ounces, valued at \$21,441,220, as against exports of 34,911,922 ounces valued at \$19,494,416, in 1912.

Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886.....	25,957	1895.....	994,354	1904.....	1,004,394
1887.....	206,284	1896.....	2,271,950	1905.....	2,777,218
1888.....	219,008	1897.....	3,576,391	1906.....	5,640,441
1889.....	212,163	1898.....	2,002,277	1907.....	9,041,849
1900.....	201,142	1899.....	1,623,905	1908.....	12,403,382
1901.....	225,312	1900.....	2,341,872	1909.....	15,719,909
1902.....	56,688	1901.....	2,026,727	1910.....	15,649,537
1903.....	213,605	1902.....	1,820,658	1911.....	15,807,366
1894.....	359,731	1903.....	1,089,474	1912.....	19,494,416
				1913.....	21,441,220

TIN.

Tin ores have not yet been found in sufficient quantities in Canada to be of economic importance.

The occurrence of tin ore has been reported from several localities, the most important, perhaps, being the discovery of cassiterite, near New Ross, Lunenburg county, Nova Scotia. This occurrence has not yet been found of economic value. It has been visited by several officers of the Geological Survey, and reports upon it may be found in the Summary Reports of the Geological Survey Branch of the Department of Mines, for 1907, 1908, 1910, and 1911.

In the Summary Report for 1912 Mr. Wright gives the following notes:—

"All of the prospects for tin are located in the muscovite granite, but there are only two that are worthy of mention here.

The Reeve's tin mine, located south of Lake Ramsay, is a 20 foot shaft on a pegmatite zone in aplitic muscovite granite. The bulk of the pegmatite is made up of feldspar and quartz. Associated with these are many pneumatitic minerals, of which muscovite, lepidolite, and fluorite are the most common. The cassiterite is said to have occurred as nuggets in the open spaces among the other minerals.

The pegmatite zone is 10 feet wide, and has been stripped for 20 feet. It was thought that this was the full length of the zone, but further development has shown that it may continue farther towards the east. The zone has no distinct wall, but grades into the aplitic country rock. Thus it is not a true pegmatite dyke, but an example on a large scale of the 'blow-outs' which are so common in this type of rock.

The other interesting prospect for tin is on the north bank of the outlet of Camp lake, about one-half mile below the lake. The lead is a well-defined zone 2 to 4 feet wide, made up of intersecting quartz stringers and the altered country rock. The quartz stringers have a general trend parallel to the main lead and carry chalcopyrite, pyrite, cassiterite, fluorite, and associated minerals. The mineral bearing solutions of the quartz veins have altered the walls into a greenish silicified mass which grades into the fresh granite about 1 foot from the vein. Generally the quartz veins are so close together that the whole mass of the included country rock is altered and mineralized.

The lead has been stripped north from the river bank for 350 feet, and two shafts sunk 30 and 50 feet respectively, and so far the nature of the lead has not changed. Southward the vein has been off-set to the southwest, about 60 feet, by a fault located in the bed of the river. As yet no work has been done on this part of the lead.

At the present time negotiations are under way to obtain an option on the property in order to do some further developing."

Tin in Black Sands.

During 1913 a sample shipment of one ton of black sand was made from the Atlin district of British Columbia, which is reported to have assayed 6.71 per cent tin. The black sand was obtained from alluvial sluice boxes in this camp. Stream tin has also been found in some of the Yukon placer deposits and a small quantity recovered in the gold dredging operations is reported to have been marketed, though no direct returns of production have been obtained.

Imports of Tin and Tinware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880....	281,880	1891....	1,206,918	1901....	2,293,958
1881....	413,924	1892....	1,394,205	1902....	2,712,186
1882....	790,285	1893....	1,212,994	1903....	2,389,557
1883....	1,274,150	1894....	1,310,389	1904....	2,791,757
1884....	1,018,493	1895....	973,307	1905....	1,336,948
1885....	1,060,883	1896....	1,237,684	1906....	2,719,813
1886....	1,117,368	1897....	1,274,198	1907 (9 mos.)...	4,059,281
1887....	1,187,312	1898....	1,550,851	1908....	2,985,361
1888....	1,164,273	1899....	1,372,813	1909....	3,822,443
1889....	1,243,794	1900....	2,418,455	1910....	4,647,784
1890....	1,289,756	1901....	2,339,109	1911....	5,420,175
				1912....	7,242,494
				1913....	

	Duty.	Lbs.	\$
Tin crystals.....	Free.		8,228
Tin in blocks, pig, and bars.....	"	5,131,900	2,286,142
Tin plates and sheets.....	"	1,291,428	4,178,323
1913 Tin foil.....	"	1,260,908	194,206
Tinware, plain, japanned or lithographed, and all manufactures of Cu, N.E.S.	25%		575,595
Total.....			7,242,494

TUNGSTEN.

No production of tungsten is reported during 1913.

Scheelite was discovered in Halifax county, Nova Scotia, in 1908. Mr. Faribault, of the Geological Survey, visited this deposit again in 1909, and a preliminary report thereon will be found in the Summary Report of the Geological Survey for 1909, pages 228 to 234. During 1910 these deposits were developed by the Scheelite Mines, Limited, who have obtained very satisfactory results.

During 1911, the Scheelite Mines, Limited, continued development and prospecting work and operated their mill, making a shipment of 14 tons of tungsten concentrates—the first shipment from Nova Scotia—carrying 72 per cent tungstic acid.

In the Summary Report for 1910, Mr. Faribault refers to a discovery in Queens county as follows:—

“A new discovery of tungsten ore in the form of scheelite has been made by A. N. Prest, at Middlefield, Queens county, near the Fifteen Mile Brook gold mine, and prospecting was started last fall in order to trace the float to the parent vein.”

The occurrence of wolframite has also been noted in association with molybdenite, by Dr. Walker, in New Brunswick, near the confluence of Burnt Hill brook and the southwest Miramichi. The property was tested by Mr. Freeze, of Doaktown, New Brunswick, and Mr. Matthew Lodge, of Moncton, who formed the Acadia Tungsten Mines Company. This Company has done a little development.

Prices were better in 1913 than in 1912, and according to the Engineering and Mining Journal, New York, January 24, 1914, ranged from \$6 to \$7.50 per unit of 20 pounds of tungsten trioxide.

ZINC.

The production of zinc ore in Canada in 1913, as obtained by direct returns from producers, was 7,889 tons, valued at \$186,827, the greater part being from British Columbia. The zinc content of these shipments was returned as 7,069,800 pounds, which, if valued at the average New York price of spelter during the year, 5.648 cents, would be worth \$399,302.

The ore shipped from British Columbia contains also a varying silver content, for which payment is made by the smelters, and without which, on account of the import duty to the United States and the long rail haul, it would not in many cases pay to ship.

The British Columbia shipments were heavy as a result of the activity of the Sloean mines and mills. There were also shipments from Notre Dame des Anges, Portneuf county, Quebec.

During the year the new United States customs tariff came into effect, considerably reducing the duties payable on Canadian ores, the new items affecting Canadian shipments being:—

Zinc ores containing 25 per cent or more zinc: 10 per cent on zinc contained therein.

Lead bearing ore: $\frac{3}{4}$ cent per pound on lead contained therein.

Although not paid for by the United States smelters, the lead in ore is considered as dutiable and as there is often a small lead content in the zinc ore or concentrates shipped, the lead duty applies. The result of the decreased duties has been a considerable increase in zinc shipments.

During 1913 there were received at American smelting works from Canadian mines 7,074 tons of zinc concentrates, containing 5,941,727 pounds of zinc.

In 1912 these works reported the receipt of 7,190 tons containing 6,392,983 pounds of zinc.

The imports of zinc, taken as an index of consumption, show a fairly steady increase. The total imports of zinc in blocks and pigs and spelter, were in 1880 some 744 tons; in 1889 they had risen to 1,427 tons and remained fairly stationary the next ten years. In 1899 they were 1,213 tons and rose to 4,110 for the fiscal year 1909.

During the calendar year 1913 the imports were 8,664 tons, in addition to which there were 6,341 tons zinc white, zinc manufactures to the value of \$54,898; also zinc dust, 206 tons, valued at \$26,403; and sulphate and chloride of zinc, 317 tons, valued at \$17,421.

Statistics of the production and imports of zinc, and the average monthly prices of spelter on the New York and London markets, are given in the following tables:—

Annual Production of Zinc.

Calendar Year.	ZINC ORE SHIPPED.		METALLIC ZINC IN ORE SHIPPED.	
	Tons.	Spot value.	Lbs.	Final value.
		\$		\$
1898	1,162	11,000	788,000	36,011
1899	865	18,165	814,000	46,805
1900	261	4,810	212,000	9,342
1901	158	1,659	142,200	6,882
1902	1,000	10,500	900,000	48,660
1903	597	3,700	477,568	24,256
1904	9,413	139,200	.	.
1905	1,154	23,800	.	.
1906	1,573	49,100	.	.
1907	452	3,215	.	.
1908	18,371	242,699	16,468,204	906,245
1909 (a)	5,063	120,003	4,361,712	240,766
1910	2,590	101,072	2,346,849	135,132
1911	6,415	215,149	5,354,700	371,777
1912	7,889	186,827	7,009,800	399,302
1913				

*Figures not available.

(a) Includes 7,424 tons shipped late in 1908.

Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880	13,805	67,881	1891	17,984	105,023	1902	34,871	141,569
1881	20,920	94,015	1892	21,881	127,302	1903	26,046	142,827
1882	15,021	76,631	1893	26,446	124,360	1904	25,553	138,057
1883	22,765	94,799	1894	20,774	90,680	1905	25,141	141,514
1884	18,945	77,373	1895	15,061	63,373	1906	21,462	158,438
1885	20,954	70,598	1896	20,223	80,784	1907 (9 mos.)	18,427	126,221
1886	23,146	85,599	1897	11,946	57,754	1908	30,362	161,081
1887	26,142	98,557	1898	35,118	112,785	1909	26,222	141,066
1888	16,407	65,827	1899	18,785	107,477	1910	35,040	201,777
1889	19,782	83,035	1900	28,748	156,167	1911	34,659	206,746
1890	18,236	92,530	1901	20,527	103,457	1912	33,379	213,141
						1913	99,311	617,138

Imports of Spelter.*

Fiscal Year	Cwt.	Value	Fiscal Year	Cwt.	Value	Fiscal Year	Cwt.	Value
		\$			\$			\$
1880	1,073	5,301	1891	6,219	31,459	1902	18,356	80,757
1881	2,901	12,276	1892	13,909	62,550	1903	23,159	110,817
1882	1,651	7,779	1893	10,721	49,822	1904	33,952	164,751
1883	1,271	5,196	1894	8,423	35,615	1905	37,941	206,241
1884	2,239	10,417	1895	9,249	30,215	1906	50,137	290,686
1885	3,325	10,875	1896	10,897	40,518	1907 (9 mos.)	42,465	269,044
1886	5,432	18,238	1897	8,342	32,826	1908	65,593	314,309
1887	6,908	25,097	1898	2,794	13,561	1909	55,981	310,688
1888	7,772	29,762	1899	5,459	29,687	1910	132,001	658,285
1889	8,750	37,403	1900	5,836	29,416	1911	98,372	505,447
1890	14,570	71,122	1901	14,621	58,283	1912	125,721	716,054
						1913	107,845	630,561

*Spelter in blocks and pigs.

Imports of Zinc, Manufactures of.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880	8,327	1891	7,178	1902	6,683
1881	20,178	1892	7,563	1903	9,751
1882	15,526	1893	7,464	1904	12,682
1883	22,599	1894	9,193	1905	11,912
1884	11,952	1895	5,581	1906	12,917
1885	9,459	1896	6,290	1907 (9 mos.)	12,556
1886	7,315	1897	5,145	1908	19,240
1887	6,561	1898	10,503	1909	15,621
1888	7,402	1899	14,661	1910	15,495
1889	7,233	1900	11,475	1911	24,128
1890	6,472	1901	6,882	1912	34,010
				1913	54,616

World's Production of Spelter in Short Tons.*

Country.	1908.	1909.	1910	1911.	1912.	1913.
Australia.....	1,198		560	1,901	2,531	4,105
Austria and Italy.....	11,063	13,931	14,666	18,602	21,609	23,856
Belgium.....	181,851	184,194	190,233	215,059	220,678	217,941
France and Spain.....	61,512	61,859	65,101	70,791	79,543	78,293
Germany.....	239,082	242,594	251,046	276,008	298,794	311,914
Great Britain.....	60,029	65,422	69,531	73,803	63,086	65,201
Holland.....	19,617	21,548	23,121	25,059	26,380	26,813
Poland.....	9,740	8,758	9,514	10,952	9,659	9,520
United States.....	210,424	255,760	269,184	286,526	338,806	346,676
Norway.....				7,363	8,059	19,040
Total.....	796,896	854,066	893,046	986,058	1,070,015	1,103,359

*Mineral Resources of the United States.

World's Consumption of Spelter in Short Tons.*

Country.	1908.	1909.	1910.	1911.	1912.	1913.
Austria-Hungary .	35,935	36,155	37,258	47,950	51,588	44,533
Belgium.....	74,956	71,209	84,326	81,240	85,088	84,216
France.....	85,869	73,744	82,050	90,389	90,389	89,286
Germany.....	198,634	207,343	203,374	241,734	248,899	255,734
Great Britain.....	152,669	171,408	195,989	193,674	204,146	214,506
Holland.....	4,189	4,469	4,469	4,469	4,469	4,469
Italy.....	9,259	9,039	8,929	11,133	11,795	12,015
Russia.....	19,621	20,282	27,447	31,856	30,754	36,707
Spain.....	5,512	4,960	4,630	5,261	5,181	6,503
United States.....	214,167	270,730	245,884	280,050	340,372	295,370
Other countries.....	11,023	9,921	13,669	19,621	21,715	23,038
Total.....	811,834	879,200	887,974	1,007,356	1,091,346	1,060,319

*Mineral Resources of the United States.

Average Price of Spelter in Cents per Pound at New York.*

Month.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	1913.
January.....	4-865	4-866	6-190	6-487	6-732	4-513	5-141	6-101	5-452	6-442	6-931
February.....	5-043	4-916	6-139	6-075	6-814	4-785	4-889	5-569	5-518	6-499	6-239
March.....	5-349	5-057	6-087	6-209	6-837	4-665	4-757	5-637	5-583	6-626	6-078
April.....	5-550	5-219	5-817	6-087	6-687	4-645	4-965	5-439	5-339	6-633	5-641
May.....	5-620	5-031	5-434	5-997	6-441	4-603	5-124	5-191	5-348	6-679	5-466
June.....	5-667	4-760	5-190	6-096	6-419	4-543	5-402	5-128	5-520	6-877	5-124
July.....	5-662	4-873	5-396	6-006	6-672	4-485	5-402	5-152	5-695	7-116	5-273
August.....	5-723	4-866	5-766	6-027	5-791	4-702	5-729	5-279	5-953	7-028	5-658
September.....	5-696	5-046	5-887	6-216	5-256	4-769	5-796	5-514	5-869	7-451	5-694
October.....	5-510	5-181	6-087	6-222	5-430	4-801	6-199	5-628	6-102	7-420	5-340
November.....	5-605	5-518	6-145	6-375	4-925	5-059	6-381	5-976	6-380	7-371	5-229
December.....	4-741	5-872	6-522	6-395	4-254	5-137	6-249	5-634	6-301	7-162	5-154
Year.....	5-46	5-100	5-922	6-198	5-962	4-726	5-503	5-520	5-758	6-943	5-648

*From the Engineering and Mining Journal, N. Y.

Average Prices of Spelter, Ordinary Brands, in London.*

Month.	1901			1905			1906			1907			1908		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	21	11	2	21	19	9	28	8	2	27	7	1	20	6	3
February	21	16	5	21	10	6	26	2	4	26	1	5	21	0	7
March	21	13	6	23	13	6	24	15	3	26	4	8	21	1	5
April	22	5	1	23	11	3	25	19	3	25	17	5	21	6	1
May	22	2	10	23	11	8	27	0	2	25	14	2	20	2	10
June	21	14	6	23	16	8	27	9	9	24	10	2	19	2	2
July	22	2	9	23	19	6	25	15	11	23	18	11	18	14	1
August	22	7	6	21	14	6	27	0	5	22	1	7	19	6	9
September	22	11	5	26	8	3	27	12	5	21	0	11	19	10	2
October	25	1	7	28	1	7	27	18	10	21	12	11	19	15	1
November	24	12	9	28	5	11	27	15	1	21	8	4	20	17	1
December	24	17	1	28	11	11	27	19	3	20	3	3	20	19	2
Year	22	11	10	25	7	7	27	1	5	23	16	9	20	3	5

Month.	1909			1910			1911			1912			1913		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	21	6	3	23	4	3	23	16	9	26	9	11	25	19	1
February	21	8	9	23	3	1	23	3	10	26	6	5	25	4	3
March	21	8	8	23	0	7	22	19	2	25	19	11	24	11	4
April	21	10	1	22	9	11	23	13	8	25	8	10½	25	2	4
May	21	19		22	1	1½	24	6	1	25	11	2	24	10	3
June	21	19	11	22	3	2	24	9	7	25	11	11	21	19	10
July	21	18	9	22	5	6	24	13	10½	25	13	½	20	11	2
August	22	0	3	22	11	0	26	11	1½	26	1	2	20	14	—
September	22	17	1	23	2	7½	27	12	6½	26	17		21	3	10
October	22	3	4	23	16	6½	27	4	10	27	5	10	20	13	9
November	23	2	1	24	1	9	26	13	11	26	14	3	20	14	4
December	23	1	3	23	17	7½	26	13	6½	26	..	4	21	6	8
Year	22	3		23	0	0	25	3	2	26	3	4	22	14	3

* From the annual publication of the Metallgesellschaft, etc., of Frankfort-on-the-Main, Germany.



