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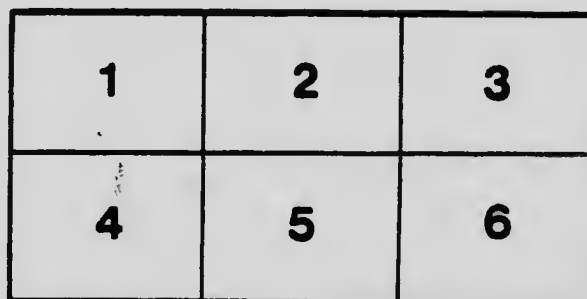
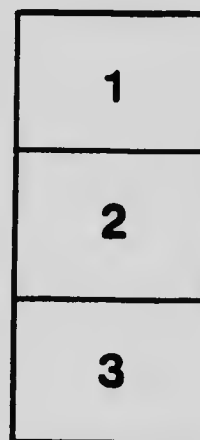
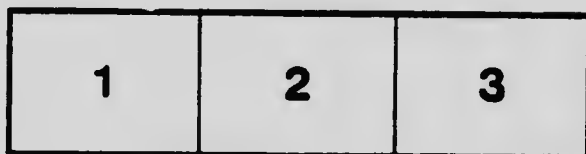
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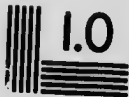
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EUGENE HAANEL, Ph.D., DIRECTOR.

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

During the Calendar Year

1911

BY

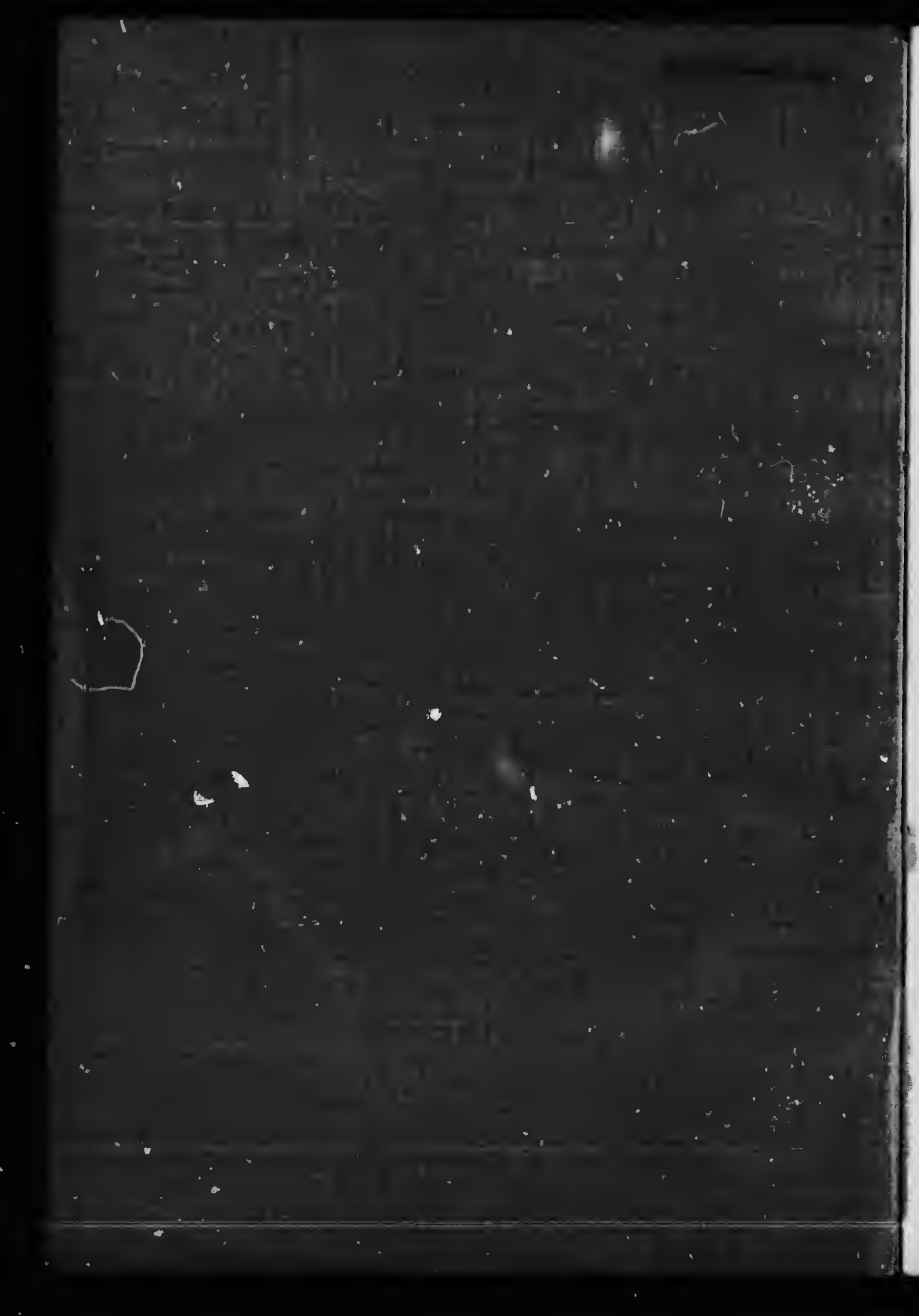
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*Assistant Mining Engineer, Division of Mineral Resources and Statistics.*



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## THE PRODUCTION OF COPPER, GOLD, LEAD, NICKEL, SILVER, ZINC, AND OTHER METALS IN CANADA DURING THE CALENDAR YEAR 1911.

*(Published as an advance chapter of the Annual Report on the Mineral Production of Canada during the Calendar Year 1911.)*

### COPPER.

The total production of copper in Canada in 1911, estimated on the basis of smelter recovery from ores treated, was 5,048,911 pounds, which at the average price of copper for the year in New York, 12.376 cents per pound, would be worth \$6,889,998.

The copper production in 1910, compiled on a similar basis, was estimated at 55,692,369 pounds, showing a slight decrease in production in 1911. The average New York price for copper in 1910 was 12.738 cents, the decrease in price being 0.362 cents or 2.8 per cent.

In the Province of British Columbia the copper production is mainly derived from ores carrying a very low content of copper metal. In the smelting of these ores the copper losses in slag are quite considerable, reaching as high, in some cases, as 25 per cent or more, of the copper content of the ore. With ores of this character there is, therefore, a wide difference between the copper content of ore shipped from the mine and the copper metal recovered by the smelters.

The statistics of copper production for the years previous to 1909 as given in Tables 1 and 2 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 sent to smelters for which smelter returns were received during the year, and these show a relatively higher copper production than the figures published by the Province of Ontario, which are based on copper content of matte produced.

The independent collection of statistics on smelter production by the Mines Branch—through the courtesy of the smelter operators—has made possible the compilation and publication of statistics of production based on smelter recoveries as given above; thus providing for a more equitable comparison of the production of the several provinces, and the production of Canada generally, with other countries.

COPPER. TABLE 1.

## Production by Provinces 1909, 1910, and 1911.

Provinces	1909		1910		1911	
	Lbs.	Value	Lbs.	Value	Lbs.	Value
		\$		\$		\$
Quebec.....	1,038,212	141,272	877,347	111,755	2,436,190	301,563
Ontario.....	15,746,699	2,044,237	19,259,016	2,453,213	17,932,263	2,219,297
British Columbia.....	35,658,952	4,626,245	35,270,000	4,492,693	35,279,858	4,366,198
Other districts.....			290,000	36,431		
Total.....	52,493,862	6,811,754	55,692,363	7,094,091	55,648,311	6,886,958

\* Includes Nova Scotia and Yukon.

† The apparently large decrease in British Columbia copper production in 1909 as compared with 1908 is mainly due to the different basis of compilation adopted in 1909, for explanation of which see the text. The British Columbia copper production in 1909 based on copper content of ores sent to smelters was 45,597,245 pounds. (See Tables 8 and 9).

‡ 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 practically all exported. The exports of copper in ore, matte, regulus, etc., from Canada during the calendar year, 1911, are reported by the Customs Department as 55,208,954 pounds, of which 49,202,456 pounds were exported to the United States, and 6,006,498 pounds to Great Britain.

The exports in 1910 were recorded as 56,964,127 pounds. These figures agree fairly closely with the statistics of smelter recovery.

*Prices.*—The average monthly 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	1907.	1908.	1909.	1910.	1911.
	Cts.	Cts.	Cts.	Cts.	Cts.
January.....	24.404	13.726	13.893	13.	12.295
February.....	24.869	12.965	12.949	13.382	12.253
March.....	25.065	12.704	12.387	13.265	12.139
April.....	24.224	12.743	12.563	12.733	12.019
May.....	24.048	12.598	12.893	12.550	11.989
June.....	22.665	12.675	13.214	12.494	12.385
July.....	21.136	12.792	12.880	12.215	12.463
August.....	18.356	13.462	13.067	12.490	12.405
September.....	15.565	13.388	12.877	12.379	12.201
October.....	13.160	13.354	12.877	12.553	12.189
November.....	13.391	14.130	12.877	12.742	12.616
December.....	13.163	14.111	13.298	12.581	13.552
Yearly average...	20.604	13.298	12.982	12.738	12.376

In London, the monthly average prices of standard copper were as shown hereunder in £ per ton of 2,240 pounds.

### Monthly Average Prices of Standard Copper in London.

Months.	1907.	1908.	1909.	1910.	1911.
	£	£	£	£	£
January . . . . .	106 730	62 300	57 088	60 923	55 164
February . . . . .	107 356	58 786	61 197	59 388	54 970
March . . . . .	106 594	58 761	56 231	59 214	51 704
April . . . . .	98 625	58 341	57 363	57 298	54 085
May . . . . .	102 375	57 387	54 338	56 313	54 313
June . . . . .	97 272	57 812	59 627	55 316	56 368
July . . . . .	95 016	57 989	58 559	54 194	56 670
August . . . . .	79 679	60 500	59 398	55 733	56 264
September . . . . .	68 375	60 338	59 021	55 207	55 253
October . . . . .	60 717	60 139	57 551	56 729	55 176
November . . . . .	61 226	63 417	58 917	57 634	57 253
December . . . . .	60 113	62 913	59 900	56 060	62 063
Yearly average . . . . .	87 007	59 902	58 732	57 051	55 973

The price of copper in New York varied between 13½ cents per pound in December and a minimum of 11 cents in May.

Statistics showing the annual copper production in Canada since 1886 are given in Table 2, which shows the yearly increase or decrease, as the case may be, and also the yearly price per pound in New York.

COPPER. TABLE 2.  
Annual Production.

Calendar Year.	Lbs.	Increase or decrease.		Value.	Increase or decrease.		Average price per pound.
		Lbs.	%		s	c	
1886	3,505,000			385,550			10 90
1887	3,250,424	(d) 214,576	6 99	306,798	(d) 18,752	4 86	10 52
1888	5,562,894	2,302,440	70 60	927,107	560,309	152 70	16 53
1889	6,800,752	1,218,858	22 40	936,341	9,234	0 99	13 75
1890	6,013,671	(d) 786,081	11 69	917,153	10,812	1 15	12 87
1891	9,529,401	3,515,730	58 18	1,226,703	270,550	29 51	11 55
1892	7,087,275	2,442,126	25 63	818,580	(d) 408,123	49 27	10 75
1893	8,109,856	1,022,581	14 40	871,809	53,229	6 50	9 56
1894	7,798,789	(d) 401,067	4 94	736,960	(d) 134,849	15 46	10 76
1895	7,771,639	62,850	0 81	836,258	99,298	13 47	10 88
1896	9,903,012	1,621,373	20 86	1,021,969	185,732	23 21	11 29
1897	13,300,802	3,907,790	41 60	1,501,665	479,700	46 94	12 03
1898	17,747,136	4,446,334	33 43	2,134,980	633,320	42 17	17 61
1899	15,978,475	(d) 2,668,661	15 04	2,655,319	520,339	24 37	16 19
1900	18,937,138	3,858,663	25 59	3,065,922	410,603	15 46	16 117
1901	37,827,019	18,889,881	99 75	4,096,581	3,030,659	98 84	11 626
1902	38,804,259	977,240	2 58	4,511,383	(d) 1,585,198	26 00	13 235
1903	42,684,454	3,880,195	10 00	5,649,487	1,138,104	25 23	12 823
1904	41,383,722	(d) 1,300,732	3 05	5,306,635	(d) 342,852	6 07	12 590
1905	48,092,753	6,709,031	16 21	7,497,660	2,191,025	11 29	19 278
1906	55,605,888	7,517,135	15 63	10,720,474	3,222,814	42 98	20 004
1907	56,679,206	1,069,317	2 46	11,398,120	677,654	6 32	12 982
1908	63,702,873	6,723,668	11 80	8,413,876	2,984,244	26 18	12 738
1909*	52,493,863			6,814,754			12 376
1910	55,692,369	3,198,506	6 09	7,094,094	270,340	4 10	
1911	55,648,011	(d) 44,358	0 79	6,886,998	(d) 207,096	2 92	

\* 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 Table 3, and statistics of imports in Tables 4 and 5. The total imports of copper in so far as weights are given, amounted during the fiscal year ending March, 1911, to 30,586,768 pounds. During the calendar year, 1911, the total imports were valued at \$4,936,769, and included crude and manufactured copper to the extent of 37,352,237 pounds, valued at \$1,721,480, together with other copper manufactures valued at \$215,289, of which the quantity is not stated. In detail these imports comprise crude copper (pigs, ingots, scrap, blocks, etc.), 8,112,387 pounds, valued at \$823,374; copper in bars, rods, coils, etc., 25,495,400 pounds, valued at \$3,272,478; copper in strips, sheets or plates, 2,826,100 pounds, valued at \$434,574; copper tubing, etc., 562,826 pounds, valued at \$113,949; and copper wire, 355,524 pounds, valued at \$77,105.

COPPER.—TABLE 3.

## Exports of Copper in Ore, Matte, etc.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		8			8
1885.....		262,600	1890.....	11,371,796	1,199,908
1886.....		249,259	1900.....	23,631,523	1,741,885
1887.....		137,966	1901.....	32,488,872	3,494,968
1888.....		257,260	1902.....	26,094,498	2,476,516
1889.....		168,457	1903.....	38,364,676	3,873,827
1890.....		398,497	1904.....	38,553,282	4,216,214
1891.....		348,104	1905.....	40,740,861	5,443,873
1892.....		277,642	1906.....	42,398,538	7,303,366
1893.....	4,792,201	269,160	1907.....	54,688,450	8,749,669
1894.....	1,625,389	91,917	1908.....	51,136,371	5,931,550
1895.....	3,742,352	236,965	1909.....	54,447,750	5,832,246
1896.....	5,462,052	281,970	1910.....	56,964,127	5,840,533
1897.....	14,022,610	850,336	1911*.....	55,298,051	5,459,770
1898.....	11,572,381	840,213			

\* Also 7,656 pounds 87,955, black or coarse and in pigs.

COPPER.—TABLE 4.

Imports of Pigs, Old, Scrap, etc.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1880.....	31,900	2,130	1895.....	86,905	9,226
1881.....	9,800	1,157	1897.....	49,000	5,449
1882.....	20,200	1,984	1898.....	1,050,000	80,000
1883.....	124,500	20,273	1899.....	1,655,000	246,740
1884.....	40,200	3,180	1900.....	1,144,000	180,990
1885.....	28,600	2,016	1901.....	351,500	152,274
1886.....	82,000	6,969	1902.....	1,767,200	325,832
1887.....	40,100	2,507	1903.....	2,038,400	252,594
1888.....	32,300	2,322	1904.....	2,115,300	270,315
1889.....	32,300	3,288	1905.....	1,944,400	266,548
1890.....	112,200	11,521	1906.....	2,627,700	441,854
1891.....	107,800	10,452	1907 (9 mos.).....	2,616,600	520,971
1892.....	343,600	14,894	1908.....	3,612,400	650,597
1893.....	168,300	16,331	1909.....	2,732,300	383,441
1894.....	101,200	7,397	1910.....	4,690,900	617,639
1895.....	72,062	6,770	1911.....	5,023,700	641,749
1911 (Copper, old and scrap or in blocks.....)		Duty free.		366,000	41,128
(Copper in pigs or ingots.....)		Duty free.		4,656,800	600,621
Total.....				5,023,700	641,749

COPPER.—TABLE 5.

Imports of Manufactures.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	123,061	1891.....	563,522	1902.....	1,281,522
1881.....	159,163	1892.....	422,870	1903.....	1,291,935
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.....	181,469	1896.....	285,220	1907 (9 mos.).....	2,545,600
1886.....	219,420	1897.....	264,587	1908.....	2,713,060
1887.....	325,365	1898.....	786,529	1909.....	2,686,205
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		

COPPER.—TABLE 5—Continued.  
Imports of Manufactures.

	Duty.	Lbs.	Value.
Copper in bars and rods, in coils, or otherwise, in lengths not less than 6 feet, unmanufactured. . . . .	Free.	21,396,800	\$ 2,845,060
Copper, in strips, sheets or plates, not planished or coated, etc. . . . .	"	3,372,800	536,862
1911. Copper tubing in lengths not less than 6 feet, and not polished, bent or otherwise manufactured . . . . .	"	517,911	106,416
Copper rollers, for use in calico printing . . . . .	"		20,361
Copper and manufactures of :—			
Nails, tacks, rivets and burrs or washers. . . . .	30 "		
Wire, plain, tinned or plated. . . . .	15 "		2,158
Wire cloth, etc. . . . .	25 "	275,557	64,720
All other manufactures of, N. O. P. . . . .	30 "		7,175
Total. . . . .			160,188
			3,742,940

#### Nova Scotia.

No copper was produced during the year, development work only being done.

#### New Brunswick.

A small shipment is reported from this Province.

#### Quebec.

The copper production of Quebec was as usual from the pyritic ores of the Eastern Townships. There was a large increase over 1910, the copper production for 1911 being 2,436,190 pounds, valued at \$301,503, representing the estimated recovery from 39,122 tons of ore and concentrates shipped containing some 3,123,189 pounds of copper.

Statistics of the copper production in this Province since 1886 are shown in Table 6.

COPPER.—TABLE 6.  
Quebec:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886. . . . .	3,340,000	367,400	1899. . . . .		
1887. . . . .	2,937,900	330,514	1900. . . . .	1,632,560	287,494
1888. . . . .	5,562,864	927,107	1901. . . . .	2,220,000	350,418
1889. . . . .	5,315,000	730,813	1902. . . . .	1,527,442	246,178
1890. . . . .	4,710,600	741,920	1903. . . . .	1,640,000	190,666
1891. . . . .	5,401,704	695,469	1904. . . . .	1,152,000	152,467
1892. . . . .	4,883,480	564,042	1905. . . . .	1,760,000	97,455
1893. . . . .	4,468,352	480,348	1906. . . . .	621,243	252,752
1894. . . . .	2,176,430	208,067	1907. . . . .	1,981,169	381,930
1895. . . . .	2,242,462	241,288	1908. . . . .	1,517,990	303,650
1896. . . . .	2,467,200	261,903	1909. . . . .	1,282,024	169,330
1897. . . . .	2,474,970	279,424	1910. . . . .	1,088,212	141,272
1898. . . . .	2,100,235	252,658	1911. . . . .	877,347	111,757
				2,436,190	301,503

## Ontario.

There is as yet comparatively little copper production in this Province besides that obtained from the nickel-copper ores of the Sudbury district. In 1911, productive operations were carried on by the Canadian Copper Company at the Creighton and Crean Hill mines, and by the Mond Nickel Company at Victoria mines.

The Ontario Government pays a bounty on copper over 95 per cent pure metal and on copper sulphate, produced from ore mined and refined in the Province. The text of the Act will be found in the chapter on cobalt under the heading 'Metal Refining Bounty Act.'

The total production of nickel-copper ore in 1911 was 619,834 tons. There were produced during the year 32,607 tons of Bessemer matte, containing 8,966 tons of copper and 17,049 tons of nickel, the shipping value of the matte being approximately \$4,945,592.

Details of the production from these ores are given more completely, and in tabular form in the article on nickel, and also under smelter production. Statistics of the copper production of Ontario since 1886 are given in Table 7.

COPPER. TABLE 7.

## Ontario:—Production.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1886.....	165,000	18,150	1899.....	5,723,324	1,007,877
1887.....	322,524	36,284	1900.....	6,740,058	1,091,215
1888.....	Nil	Nil.	1901.....	8,695,831	1,401,507
1889.....	1,466,752	201,678	1902.....	7,408,202	861,278
1890.....	1,303,065	205,233	1903.....	7,172,533	949,285
1891.....	4,127,697	531,234	1904.....	4,913,594	630,070
1892.....	2,203,795	254,538	1905.....	8,779,259	1,368,686
1893.....	3,641,504	391,461	1906.....	10,634,231	2,050,838
1894.....	5,297,679	497,854	1907.....	14,104,337	2,821,432
1895.....	4,576,337	492,414	1908.....	15,005,171	1,981,883
1896.....	3,167,256	344,598	1909.....	15,746,699	2,044,237
1897.....	5,500,652	621,023	1910.....	19,259,016	2,453,213
1898.....	8,375,223	1,007,539	1911.....	17,932,263	2,219,297

## British Columbia.

According to the returns received from smelters, the total quantity of copper contained in matte, blister, and copper sulphate produced in British Columbia smelters during 1911, and including an estimate of smelter recovery for the copper ores exported, was 35,279,558 pounds, after deducting the amount of copper produced from foreign ores. The production in 1910 on a similar basis was 35,270,006 pounds, and in 1909, 35,658,952 pounds. Returns of smelter pro-

duction 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 36,927,656 pounds in 1911, as compared with 38,243,934 pounds in 1910. Statistics of the annual production since 1894, as ascertained by the Provincial Department of Mines, are shown in Table 8, and by districts since 1906, in Table 9.

According to direct returns in 1911, the ores of the Boundary district produced about 58.2 per cent of the total, the Rossland mines about 10.4 per cent, and the Coast district 31.4 per cent.

COPPER.—TABLE 8.

## British Columbia:—Copper Content of Ores Shipped.†

Calendar Year.	Copper contained in ores, shipped.		Increase.		Value. \$
	Lbs.	Lbs.		%	
1894	324,680				31,039
1895	952,840				102,526
1896	3,818,556	2,865,716	193	00	415,450
1897	5,325,180	1,506,624	39	00	601,213
1898	7,271,678	1,946,498	36	00	874,783
1899	7,722,591	450,913	6	00	1,359,348
1900	9,977,080	2,254,489	20	00	1,615,280
1901	27,523,746	17,626,666	177	00	4,448,896
1902	24,636,057	2,032,311	7	00	3,445,488
1903	34,359,321	4,723,864	16	00	4,547,735
1904	35,710,128	1,350,207	3	7	4,579,110
1905	37,692,251	1,982,123	5	6	5,876,222
1906	42,990,488	5,298,237	14	1	8,287,706
1907	40,832,720	2,157,768	5	02	8,168,177
1908	47,274,614	6,441,894	15	8	6,244,031
1909	45,597,245	1,677,369	3	6	5,918,522
1910	38,243,934				4,871,512
1911	36,927,656	1,316,278	3	4	4,571,644

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



COPPER.—TABLE 9.

## British Columbia:—Production\* by Districts.

	1906.	1907.	1908.	1909.	1910.1	†1911.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar.....	293,269	674,887	490,873	157,651	.....	19,151
East Kootenay.....	6,910	.....	.....	.....	.....	.....
West Kootenay.....	.....	.....	.....	.....	.....	.....
Nelson.....	216,034	434,222	53,243	186,572	231,936	.....
Slocan.....	2,861	.....	.....	.....	.....	.....
Trail Creek.....	4,750,110	5,080,275	5,042,244	3,509,909	3,577,745	3,429,702
All other.....	1,145	.....	.....	.....	.....	.....
Yale—	.....	.....	.....	.....	.....	.....
Boundary.....	32,226,782	31,521,550	40,178,521	40,603,042	31,354,985	22,327,359
Ashcroft.....	355,377	38,706	3,269	.....	1,178	152,723
Kamloops.....	5,138,000	3,083,080	1,506,464	1,160,071	3,078,090	10,998,721
Coast districts.....	.....	.....	.....	.....	.....	.....
Total.....	42,990,488	40,832,720	47,274,614	45,597,245	38,243,934	36,927,656

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

The low grade ores of the Boundary district, in addition to being self-fluxing, are remarkably uniform in character, ranging from 1 to 2 per cent in copper, and from \$1 to \$2 in gold and silver. In this district the greater part of the production has been obtained from the properties of the four principal companies: The Granby Consolidated Mining, Smelting, and Power Company, Limited; The British Columbia Copper Company, Limited; The Consolidated Mining and Smelting Company of Canada, Limited, and the New Dominion Copper Company, Limited. The last named is controlled by the British Columbia Copper Company. The first three Companies operated their own smelters, and the first two convert their matte into blister copper.

The approximate ore shipments during 1911, and the total shipments of the chief producers to the end of 1911, were as follows:—

	1911.	Total.
Granby Consolidated Mining, Smelting & Power Co., Ltd.....	905,880	7,415,880
British Columbia Copper Co., Ltd.....	366,485	2,751,485
Dominion Copper Co., Ltd.....	187,697	831,697
Consolidated Mining and Smelting Co., of Canada, Ltd.....	30,000	613,000

The Granby Company's mines at Phoenix are equipped for a daily output of about 5,000 tons. At the Company's smelter at Grand Forks, about 630,000 tons of ore were treated during the year 1911, producing about 11,400,000 pounds of copper.

The large falling off was due to the strike among the miners of the Crow's-nest Pass coal district, causing a cessation of fuel supply, and though an attempt was made to secure eastern coke, it was found too costly and the Granby smelter was, therefore, closed for nearly five months of the year. The other smelters were

also adversely affected. The chief mines shipping were: the Granby mines; the Mother Lode, Emma, and Wellington of the British Columbia Copper Co.; the Rawhide and Athelstan of the New Dominion Copper Co., and the Snowshoe of the Consolidated Mining and Smelting Co.

Next to the Boundary, the Coast district was the most important copper producer of the year, due mainly to the greatly increased output of the Britannia and Marble Bay mines, especially of the former.

Roseland's gold-copper ores, though most valuable for their gold content, form another important source of the copper supply of the Province. Some shipments were also made from Kamloops. On the Coast a considerable amount of development is being carried on, the most important being on Alice arm, Observatory inlet, where the Granby Consolidated Mining, Smelting & Power Co. are doing extensive work on their Hidden Creek property, near which on Granby bay they are also erecting a smelter for their own and customs ores.

#### **Yukon District.**

No shipments of copper ores are reported from this district during 1911.

## GOLD.

*Refined Metal.*—Gold bullion is received, assayed, and purchased at the Assay Office in Vancouver, operated in connexion with this Department, the bullion being resold. The total quantity of bullion thus received during the twelve months ending December 31, 1911, was 39,069.31 ounces, being the weight after melting, valued at \$647,416.38, after deducting assay charges.

A refinery has been erected at the Royal Mint at Ottawa, and small shipments of gold have been received from different provinces, but at present the greater part of the Canadian gold finds its way to the United States refineries or to the United States Mint.

There is but one other refinery in Canada producing fine gold; that at Trail, established in 1904, operated by the Consolidated Mining and Smelting Company of Canada, Limited, the annual output of which in ounces of fine gold for the years 1904-1911 is shown below. The gold is recovered from the ores treated in the lead furnaces.

### Production of Refined Gold at Trail, B.C.

Year.	Ozs.
1904 .....	4,336
1905 .....	8,602
1906 .....	9,993
1907 .....	10,395
1908 .....	15,346
1909 .....	18,241
1910 .....	13,298
1911 .....	15,270

*Mine Production.*—The production of gold in Canada—made up of gold derived from alluvial workings, gold obtained from the crushing of free milling quartz ores, and the gold obtained from other metalliferous ores sent to copper and lead smelters, etc.—reached a total, in 1911, of 473,159 fine ounces, valued at \$9,781,077, as compared with 493,707 fine ounces, valued at \$10,205,835, produced in 1910, a decrease of 20,548 ounces in quantity and \$424,758 in value, or 4.16 per cent.

The production by provinces in 1909, 1910, and 1911 is shown in Table 1 as follows:—

GOLD.—TABLE 1.  
Production by Provinces, 1909, 1910, and 1911.

	1909.		1910.		1911.	
	Ozs. (fine †)	Value.	Ozs. (fine †)	Value.	Ozs. (fine †)	Value.
		\$		\$		\$
Nova Scotia . . . . .	(b) 10,193	210,711	7,928	163,891	7,781	160,854
Quebec . . . . .	(b) 193	3,900	124	2,565	(a, b) 613	12,672
Ontario . . . . .	(b) 1,569	32,425	3,089	63,849	2,062	42,623
Alberta . . . . .	(a) 25	525	89	1,850	10	207
British Columbia . . . . .	(c) 250,329	5,174,579	261,386	5,403,318	238,496	4,930,145
Yukon . . . . .	(a) 191,365	3,960,000	221,091	4,570,362	224,197	4,634,574
Totals . . . . .	453,865	9,382,230	493,707	10,205,835	473,159	9,781,077

† Calculated from the value: one dollar = 0.018375 ozs.

(a) Placer gold.

(b) Gold from vein mining.

	1909.	1910.	1911.
	\$	\$	\$
(c) As follows: Gold from placer mining . . . . .	477,000	540,000	426,000
Gold from vein mining . . . . .	4,697,579	4,863,318	4,504,145
	5,174,579	5,403,318	4,930,145

The exact value of fine gold is  $\frac{32}{327}$  dollars per ounce equivalent to \$20.671834. (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  $\frac{32}{327}$  or 0.048375.

Of the total production in 1911, about \$5,014,207 or 51.3 per cent is to be attributed to alluvial workings, \$513,991 or 5.2 per cent derived from stamp milling, and \$4,252,579 or 43.5 per cent obtained from ores sent to the smelters. There was a general decrease in all the provinces except Quebec and Yukon, which show a gain.

Statistics of the annual gold production of Canada are shown in Table 2.

## GOLD.—TABLE 2.

## Annual Production in Canada, 1858-1911.

Calendar Year.	Ozs. (fine t)	Value.	Calendar Year.	Ozs. (fine t)	Value.
		\$			\$
1858	31,104	705,000	1885	55,575	1,148,820
1859	78,120	1,615,072	1886	70,782	1,463,196
1860	107,806	2,228,543	1887	57,460	1,187,801
1861	128,073	2,666,118	1888	53,145	1,098,610
1862	135,301	2,798,774	1889	62,653	1,295,159
1863	262,498	4,186,011	1890	55,620	1,149,776
1864	193,005	4,126,199	1891	15,018	300,614
1865	192,898	3,987,662	1892	43,905	907,601
1866	152,555	3,153,597	1893	47,243	976,603
1867	145,775	3,013,431	1894	54,600	1,128,688
1868	134,169	2,773,527	1895	100,798	2,083,674
1869	102,720	2,123,465	1896	133,262	2,754,774
1870	83,415	1,724,348	1897	291,557	6,027,916
1871	105,187	2,174,412	1898	693,386	13,775,420
1872	90,283	1,866,321	1899	1,028,529	21,261,581
1873	74,346	1,536,871	1900	1,350,057	27,908,153
1874	97,856	2,022,862	1901	1,167,216	24,128,503
1875	130,300	2,693,533	1902	1,032,161	21,336,667
1876	97,729	2,020,243	1903	911,559	18,843,560
1877	94,304	1,949,444	1904	796,374	16,462,517
1878	74,420	1,538,394	1905	684,951	14,159,195
1879	76,547	1,582,358	1906	556,415	11,562,120
1880	63,121	1,304,824	1907	405,517	8,382,700
1881	63,524	1,313,153	1908	476,112	9,842,105
1882	60,288	1,246,268	1909	453,865	9,382,290
1883	53,853	1,113,246	1910	493,707	10,205,835
1884	51,292	1,058,430	1911	473,150	9,781,077
				14,398,624	297,646,065

(Calculated from the value: One dollar=0.048375.

It will be observed that previous to 1897 the production only twice exceeded \$4,000,000, the maximum during the period being, in 1863, when the output reached \$4,186,011. The discovery in 1896 of the rich placer deposits of the Yukon, however, caused a rapid increase in the production for the next four years, a record maximum being reached in 1900, when the total was only a little less than \$28,000,000. The following year showed a falling off in the Yukon output, as did each succeeding year until 1908. The Yukon production in 1909, 1910, and 1911 has shown an increase, and the total for Canada seems to have an upward tendency, though there is a decrease in the year 1911.

## Nova Scotia.

The gold production of Nova Scotia, which is derived almost entirely from quartz ores, was 7,751 fine ounces, valued at \$160,854.

The principal operators in 1911 were:—

- United Finance Co., Carleton.
- Caribou Gold Mines, Caribou.
- Albert Logan, Caribou.

Stillwater Mining Co., Moose River.  
 Tributors, Moose River.  
 Malcolm McLeod et al., Fifteenmile Stream.  
 H. C. Borden et al., Fifteenmile Brook.  
 Uniac Mines and Power Co., Gold River.  
 E. F. Walton, Kemptville.  
 Petpeswick Mining Co., Lake Catchu.  
 W. F. Fancy et al., Malaga.  
 Nova Scotia Gold Mines, Montagu.  
 W. A. Brennan, Oldham.  
 Tributors, Oldham.  
 New England Mining Co., Stormont.  
 Sydney Gold Mining Co., Stormont.  
 Seal Harbour Leasing Co., Stormont.  
 Boston and Goldenville Mining Co., Shiers Point.  
 West Gore Antimony Company, West Gore.  
 Dominion Leasing Co., Tangier.  
 E. E. Fraser, Moosehead.  
 Great Bras d'Or Gold Mining Co., Middle River.  
 M. J. O'Brien, Renfrew.

Statistics of the annual production since 1862 are shown in Table 3, and the production of gold by districts during the twelve months ending September 30, 1911, as collected and published by the Provincial Mines Department, in Table 4, while the total production from 1862 to 1911, by districts, according to the same authority, is shown in Table 5.

## GOLD. TABLE 3.

## Nova Scotia:—Annual Production.

	Tons. (traced).	Ozs. (fine)	Value.	Yield of gold per ton.		Tons. (traced).	Ozs. (fine).	Value.	Yield of gold per ton.
			*	*				*	*
1862	6,473	9,863	141,871	21.91	1887	32,286	20,009	113,631	12.81
1863	17,000	13,180	272,448	16.02	1888	36,178	21,137	436,309	12.08
1864	21,431	18,883	390,349	18.21	1889	39,160	21,073	510,029	13.02
1865	21,121	24,011	196,357	20.32	1890	42,710	22,078	474,990	11.11
1866	32,157	23,776	991,191	15.28	1891	36,351	7,841	451,503	12.42
1867	31,884	25,763	532,563	16.90	1892	32,562	18,865	389,965	11.98
1868	32,259	19,377	409,555	12.41	1893	42,354	18,436	381,095	8.99
1869	36,114	16,855	348,427	19.91	1894	55,357	18,831	389,338	7.01
1870	30,824	8,740	387,392	12.56	1895	60,600	21,919	453,119	7.17
1871	30,787	18,139	374,972	12.17	1896	69,169	23,876	493,568	7.13
1872	17,089	12,352	255,349	14.94	1897	73,192	27,195	562,195	7.68
1873	17,708	11,180	231,422	13.05	1898	82,747	26,051	538,596	6.50
1874	13,844	8,623	178,244	12.87	1899	112,226	29,876	617,604	5.50
1875	11,810	10,576	218,629	14.76	1900	87,300	28,065	508,553	6.85
1876	15,490	11,300	231,585	15.08	1901	91,948	26,459	546,963	5.92
1877	17,390	15,925	329,205	18.96	1902	93,042	30,348	627,357	6.68
1878	17,989	11,804	245,253	13.63	1903	103,856	26,533	527,809	5.08
1879	15,936	12,980	288,328	16.83	1904	45,436	19,362	214,200	4.71
1880	13,997	12,472	257,823	18.42	1905	57,771	13,797	283,363	4.96
1881	16,550	19,147	269,755	12.66	1906	66,059	12,223	252,676	3.82
1882	21,081	13,367	275,090	13.04	1907	58,559	13,675	282,686	4.82
1883	25,954	14,571	804,267	11.60	1908	61,536	11,812	244,799	3.97
1884	25,186	15,168	313,554	12.14	1909	56,790	10,193	219,711	3.71
1885	28,890	20,945	432,971	14.98	1910	43,006	7,928	163,891	3.81
1886	29,010	22,038	455,484	15.70	1911	18,328	7,781	169,854	8.78

Total fine ounces gold. . . . . 883,735  
 Total value. . . . . 818,268,496

## GOLD.—TABLE I.

Nova Scotia:—District Details—Year ended September 30, 1911.

District.	Tons crushed	Total yield of gold.			Average yield of gold per ton.		
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.
Stormont.....	5,733	2,615	2	19	.....	9	2
Wagamateook.....	125	23	1	.....	.....	3	17
Uniake.....	10	.....	2	.....	.....	.....	5
Gold River.....	40	45	1	.....	.....	18	11
Caribou.....	754	850	4	18	.....	2	13
Caribou (Moose River)	561	245	5	14	.....	7	13
Tangier.....	5,202	1,746	13	.....	.....	6	17
Oldham.....	305	278	19	1	.....	14	2
Lake Catcha.....	863	320	5	8	.....	7	10
Fifteenmile Stream.....	242	155	7	.....	.....	12	20
Fifteenmile Brook.....	250	25	15	.....	.....	2	1
Kemptville.....	25	16	6	.....	.....	13	1
Carleton.....	48	36	13	2	.....	15	8
Malaga Barrens.....	233	69	14	12	.....	5	23
Montagu.....	41	24	2	.....	.....	11	8
Renfrew.....	3,493	1,527	.....	.....	.....	8	14
Shiers Point.....	14	7	6	.....	.....	10	10
Sherbrook (Montareh).....	.....	3	9	.....	.....	.....	.....
	18,128	7,990	15	7	.....	8	20
West Gore (Gold in concent- rates).....	101	338	16	21	2	1	18
	18,319	8,480	12	4	.....	9	1



## GOLD. TABLE 5.

## Nova Scotia:—Production of Gold from 1862 to 1911.

District	Tons crushed.	Total yield of gold.			Average yield of gold.			Value at \$19 per oz.
		Ozs.	Dwts.	Grs.	Ozs.	Dwts.	Grs.	
* Carbon and Moos River.	217,647	58,881	3	6	5	9	118,742	
Montagu	21,523	42,473	3	6	1	8	891,290	
Oldham	58,421	67,215	17	22	1	3	1,277,192	
Renfrew	58,411	47,325	17	19	16	5	899,192	
Sherbrooke	300,213	153,000	1	4	10	5	2,908,711	
Stornoway	52,074	119,743	15	13	4	11	2,275,132	
Tangier	60,262	27,069	6	19	9		511,317	
† Muske	63,341	43,932	19	17	13	21	835,677	
Waverly	155,520	66,680	10	16	9	0	1,329,630	
Brookfield	43,527	38,700	2	2	8	7	735,479	
‡ Salmon River	449,819	11,852	5	20	7	1	735,193	
§ Whiteburn	3,907	9,800	0	2	1	8	186,200	
¶ Lake Catewa	28,065	27,306	41	17	19	11	518,925	
* Rawdon	12,189	9,606	5	10	15	18	182,519	
Wine Harbour	77,396	34,992	15	11	9	1	641,863	
Fifteenmile Stream	36,878	17,962	0	5	9	10	329,897	
Malaga	22,924	20,265	12	6	17	17	385,800	
Other districts	142,987	71,704	17	14	10	11	1,429,534	
	2,004,006	904,163	6	7	9	1	17,479,193	
Not included in above:								
gold extracted from 1905	527	1,232	16	23	2	6	23,424	
or contained in ore 1906	783	1,031	13	14	1	8	19,692	
not shipped from 1907	1,463	1,319	18	12	18	19	25,078	
Wes. Gore, as per 1908	130	179	5	0	1	23	3,406	
returns 1910	203	350	4	15	1	11	6,654	
1911	191	398	16	21	2	18	7,578	
Total	2,007,246	908,676	1	17	9	1	17,204,845	

\* From 1869. † From 1866. ‡ From 1883. § From 1887. ¶ From 1882. \* From 1887. From 1883.

The following notes with respect to operations during 1911, are taken from the report of the Provincial Department of Mines:—

"I regret to report that the amount of gold produced is the smallest since the production of the year 1862 and that the tonnage crushed is the smallest tonnage crushed since the year 1882. The direct causes of the small production of the year 1911 may be attributed to the closing down of the Richardson mine at Goldboro and the Oldham-Stirling mine at Oldham. These two mines have been in recent years the largest producers of bullion in the Province."

"Gold in this Province occurs in ore shoots or specially enriched zones in quartz veins both of the interbedded and fissure type, varying in width from one inch to several feet but usually from 2 inches to 24 inches. Carefully organized prospecting and developing operations carried on underground with strong financial backing are needed and for the individual or company that is prepared to undertake gold mining along these lines, Nova Scotia offers a promising field of operations."

## Quebec.

The production of gold reported from this Province since 1903 has been almost entirely from the pyritic ores mined at Capelton and Eustis in the Eastern Townships. Very little gold has been obtained from the alluvial deposits of the St. Francis, Chamlière, and Gilbert rivers since 1894, when the output was returned as \$29,106. However, renewed activity in the installation of hydraulic plants has raised the alluvial gold production to an amount in excess of that from lode mining.

GOLD. TABLE 6.

## Quebec:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1877.....	583	12,057	1896.....	115	3,000
1878.....	868	17,937	1897.....	41	900
1879.....	1,160	23,972	1898.....	295	6,089
1880.....	1,665	33,474	1899.....	233	4,916
1881.....	2,741	56,661	1900.....	Nil.	Nil.
1882.....	827	17,933	1901.....	145	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	3,940
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.....	759	15,696			
1894.....	1,412	29,106		15,556	322,162
1895.....	62	1,281			

\* Calculated from the value: one dollar = 0.018375 ozs.

## Ontario.

The producing properties, in 1911, were:

- Cordova Mines, Ltd., Cordova mine, Peterborough Co.
- Sturgeon Lake Development Co., St. Anthony mine, Sturgeon Lake.
- Great Golconda Mines, Ltd., Laurentian mine, Gold Rock.
- Kenora Mines, Ltd., Mikado mine, Kenora.
- The Dome Mines Co., Ltd., Dome mine, Porcupine district.
- The Hollinger Gold Mines, Ltd., Hollinger mine, Porcupine district.
- American Eagle Mining Co., American Eagle, Porcupine district.
- Swastika Mining Co., Ltd., Swastika mine, Porcupine district.

The past year has witnessed considerable activity in the Rainy River district. The Porcupine output would have been much greater had it not been for the fire causing such a lamentable loss of life and property. Statistics of production of gold in Ontario since 1887 are shown in Table 7, following:—

GOLD. TABLE 7.

## Ontario:—Annual Production.

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	229,828
1889.....	Nil.	Nil.	1903.....	9,076	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	66,389
1895.....	3,015	62,320	1909.....	1,569	32,425
1896.....	5,563	115,000	1910.....	3,089	63,849
1897.....	9,157	189,294	1911.....	2,062	42,625
1898.....	12,863	265,889			
1899.....	20,394	421,591		123,517	2,533,309
1900.....	14,301	297,495			

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

## Alberta.

The value of gold derived from the placer deposits of the Saskatchewan river was, in 1909, \$525; in 1910, \$1,850; and in 1911, \$207.

Statistics of the production of gold from the Saskatchewan river since 1887 are shown in Table 8.

GOLD. TABLE 8.

## Alberta:—Annual Production.

Calendar Year.	Ozs. (fine*).	Value.	Calendar Year.	Ozs. (fine*).	Value.
		\$			\$
1887.....	102	2,100	1901.....	726	15,000
1888.....	58	1,200	1902.....	484	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	10,506	1906.....	39	800
1893.....	466	9,640	1907.....	33	675
1894.....	726	15,300	1908.....	50	1,037
1895.....	2,419	50,000	1909.....	25	525
1896.....	2,661	55,000	1910.....	89	1,850
1897.....	2,419	50,000	1911.....	10	207
1898.....	1,209	25,000			
1899.....	726	15,000		14,611	302,040
1900.....	242	5,000			

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

## British Columbia.

The gold production of British Columbia in 1911, as reported to the Department, amounted to \$4,930,145, comprising placer gold \$126,000, bullion from milling ores \$310,512, smelter recoveries \$4,193,633.

The placer production is as published by the Provincial Mining Bureau. The statistics for lode gold represent as closely as can be ascertained the actual gold recovery based on smelter recoveries and bullion shipments. This production is less than that published by the Provincial Bureau of Mines, which for lode gold is based on the gold content of ores shipped to smelters, etc. According to this authority the production for 1911 was \$5,151,513, as compared with \$6,073,380 in 1910, a decrease of \$921,867.

In lode mining, there were decreases in the Nelson, Trail Creek, and Boundary districts, while there was a large increase in the Coast gold production.

In alluvial gold recovery a general decrease was shown.

Of the 1911 production, 9 per cent was from alluvial workings; 6 per cent from free milling ores, and 85 per cent from ores sent to the smelters.

Statistics of the production by districts in 1911, as published by the Provincial Department of Mines, are shown in Table 9, while the total annual production since 1858 is given in Table 10.

GOLD. TABLE 9

## British Columbia:—Production by Districts,\* 1911.

Districts.	GOLD PLACER.		GOLD LODGE.	
	Ozs.	Value.	zs.	Value.
		\$		\$
Cariboo:—				
Cariboo.....	6,800	136,000		
Quesnel.....	1,700	34,000		
Omineca.....	500	10,000		
Cassiar:—	11,250	225,000	3	62
Atlin.....	300	6,000	500	10,335
All other.....				
East Kootenay:—				
Fort Steele.....	150	3,000		
West Kootenay:—				
Ainsworth.....			4	83
Nelson.....	50	1,000	17,640	364,619
Slocan.....			47	971
Trail Creek.....			116,693	2,411,837
Others.....	100	2,000	57	1,178
Lillooet.....	250	5,000	71	1,467
Yale:—				
Grand Forks.....	50	1,000	87,745	1,813,606
Spokkameen.....	50	1,000		
Yale.....	50	1,000	52	1,077
Coast and all other.....	50	1,000	5,815	120,190
	21,300	426,000	228,617	4,725,513

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

## GOLD.—TABLE 10.

## British Columbia:—Annual Production.

Calendar Year.	Ozs. (fine <sup>†</sup> ).	Value.	Calendar Year.	Ozs. (fine <sup>†</sup> ).	Value.
		8			8
1858.....	34,101	705,000	1886.....	43,714	903,651
1859.....	78,129	1,615,072	1887.....	33,558	693,709
1860.....	107,806	2,228,543	1888.....	29,834	616,731
1861.....	128,973	2,666,118	1889.....	28,480	588,923
1862.....	128,528	2,656,903	1890.....	23,918	494,436
1863.....	189,318	3,913,563	1891.....	20,792	429,811
1864.....	180,722	3,735,850	1892.....	19,327	399,525
1865.....	168,887	3,491,205	1893.....	18,390	379,535
1866.....	128,779	2,662,106	1894.....	25,664	530,530
1867.....	120,012	2,480,868	1895.....	61,280	1,266,954
1868.....	114,792	2,372,972	1896.....	86,504	1,788,296
1869.....	85,865	1,774,978	1897.....	131,805	2,724,657
1870.....	64,675	1,336,956	1898.....	142,215	2,939,852
1871.....	87,048	1,799,440	1899.....	203,295	4,202,473
1872.....	77,981	1,610,972	1900.....	228,916	4,732,105
1873.....	63,166	1,305,749	1901.....	257,292	5,318,703
1874.....	89,233	1,844,618	1902.....	288,383	5,961,409
1875.....	119,724	2,474,904	1903.....	284,108	5,873,036
1876.....	86,429	1,786,648	1904.....	275,975	5,704,908
1877.....	77,796	1,608,182	1905.....	285,529	5,902,402
1878.....	61,688	1,275,204	1906.....	269,886	5,579,039
1879.....	62,467	1,290,058	1907.....	236,216	4,883,029
1880.....	49,044	1,013,827	1908.....	286,858	5,929,880
1881.....	59,636	1,046,737	1909.....	250,320	5,174,579
1882.....	46,154	954,085	1910.....	261,386	5,403,318
1883.....	38,422	794,252	1911.....	238,496	4,930,145
1884.....	35,612	736,165			
1885.....	34,527	713,738			
				6,542,536	135,246,250

<sup>†</sup> Calculated from the value: one dollar = 0.048375 ozs.

The placer and hydraulic mining situation shows little change from 1910. There appears to have been a slight decrease, many of the larger companies being still engaged in constructive work. A shortage of water also interfered with the clean up.

Among the camps of the Province producing gold from lode mines Ros-land ranks first. The principal companies carrying on active operations during 1911 were as follows:—

The Consolidated Mining and Smelting Company of Canada, Limited, with total shipments of 190,676 tons.

The Le Roi Mining Company, Limited, shipping 6,915 tons in the early part of the year. This Company having gone into voluntary liquidation, sold the Le Roi mine to the Consolidated Mining and Smelting Co. who are now operating it.

The Le Roi No. 2 Mining Company, Limited, shipping 24,800 tons of first class ore and 1,595 tons of concentrates, which were produced from the milling of 18,778 tons of second class ore.

Several of the smaller properties of the camp were actively operated during the year.

The Boundary district comes next in gold production. The output is largely due to the large tonnage of copper ores mined in this district. These ores will average in gold only from 0.01 to 0.05 ounces per ton. Included with this district is the Osoyoos Mining Division, in which is situated the Nickel Plate mine at Hedley, operated by the Hedley Gold Mining Company. In this Company's report for 1911, the following details of interest are given: "Total lineal feet of development in 1911, 1,315; total diamond drilling, 3,030 feet; tons milled, 57,815; assay value, \$10.55 to \$14.36 per ton; receipts, \$679,616.17; expenditures, \$370,814.29; profit, \$308,802.18."

Nelson Mining Division was rather inactive and may be said to have undergone a period of reorganization. The ore is in most cases free-milling, and several of the mines treat the ore in stamp mills producing bullion and concentrates. Others ship direct to the smelter.

There was an increase of production in the Coast district.

### Yukon.

The production of the Yukon in 1911 was \$4,634,574, as compared with \$4,570,362 in 1910, an increase of \$64,212 or 1.4 per cent. In this is included \$54,574 produced by lode mines in the district. The statistics of the production of gold in the Yukon district during the years between 1898 and 1906, as given in Table 11, are based primarily on the receipts of gold at the United States mints and receiving offices and credited to the Canadian Yukon. Although a royalty was exacted on the gold output, it seems certain that particularly during the years of high production, considerable amounts of gold were produced which escaped royalty payment. During the past six years however, the gold production of the Yukon, as ascertained by the Interior Department, and on which royalty of 2½ per cent is imposed, has agreed fairly closely with the quantities reported at the United States receiving offices as having been derived from the Canadian Yukon. For the purpose of collecting the royalty, a fixed value of \$15 per ounce is placed upon the crude gold. The actual value of the gold will average somewhat higher than this, however. The average 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, 1911, 2,073.61 ounces from the Yukon, valued, after all charges had been deducted, at \$34,994.39, showing an average value of about \$16.88 per ounce.

The production of crude placer gold in the Yukon, during the past six years, as ascertained by the Department of the Interior, 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.	1906.	1907.	1908.	1909.	1910.	1911.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
January.....	3,732.94	7,308.95	2,464.00	69.50	16.68	.....
February.....	11,693.99	213.00	47.30	115.33	749.28	435.66
March.....	10.30	60.80	16.65	848.39	193.81	13.30
April.....	784.77	202.89	947.00	3.75	0.50	.....
May.....	64,060.66	35,736.62	6,851.96	117.33	43.83	16,719.45
June.....	57,578.27	31,402.14	51,530.90	62,254.92	54,301.17	38,439.39
July.....	49,012.36	26,793.50	53,291.11	52,126.43	37,942.31	42,783.38
August.....	54,947.07	22,392.10	37,930.99	47,440.83	47,673.06	47,677.49
September.....	53,487.08	33,119.51	39,654.27	44,466.29	57,695.65	48,383.63
October.....	51,799.53	35,589.70	37,028.98	26,572.23	51,888.18	58,690.82
November.....	131.81	200.30	1,989.39	4,858.69	21,404.29	11,067.51
December.....	3,352.83	52.80	5,491.76	892.75	3,563.75	13,130.63
	350,391.61	193,078.22	219,244.31	239,766.35	275,472.51	277,430.97

In 1911 the placer production is estimated as \$1,580,000 in gold, representing 221,557 fine ounces of metal, and 50,300 fine ounces of silver, valued at \$26,812, being at the average price of fine silver for the year, making a total valuation of the Yukon placer output of \$1,606,812. In 1910 the placer production was estimated at \$4,550,000, representing 220,106 fine ounces of gold, and 50,000 fine ounces of silver, valued at \$26,743, making a total valuation of \$4,576,743.

Statistics of the annual production of gold in the district since 1885 are shown in Table 11.

GOLD.—TABLE 11.

## Annual Production in Yukon.

Calendar Year.	Ozs. (fine‡).	Value.	Calendar Year.	Ozs. (fine‡).	Value.
		\$			\$
1885.....	4,387	100,000	1899.....	774,000	16,000,000
1886.....	.....	.....	1900.....	1,977,553	22,275,000
1887.....	3,386	70,000	1901.....	879,750	18,000,000
1888.....	1,935	40,000	1902.....	701,437	14,500,000
1889.....	8,466	175,000	1903.....	592,594	12,250,000
1890.....	8,466	175,000	1904.....	407,938	10,500,000
1891.....	1,935	40,000	1905.....	381,001	7,876,000
1892.....	4,233	87,500	1906.....	270,900	5,600,000
1893.....	8,514	176,000	1907.....	152,381	3,150,000
1894.....	6,047	125,000	1908.....	174,150	3,500,000
1895.....	12,094	250,000	1909.....	191,565	3,900,000
1896.....	14,513	300,000	1910.....	221,031	4,570,362
1897.....	120,937	2,500,000	1911.....	224,197	4,634,574
1898.....	483,750	10,000,000			
				6,818,670	140,954,436

‡ Calculated from the value; one dollar = 0.048375 ozs.

\* Including a small production from lode mines.

Since 1898, a royalty to the extent of \$3,889,907 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Interior Department, are shown

in the accompanying table. The difference between these figures and those shown in Table 11, which are based on the mint receipts of Yukon gold, has already been mentioned and is probably due to two main factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, a figure from \$1 to \$15 less than the actual value of the gold, and (2) the probability that in the earlier years of royalty collection considerable quantities of gold dust left the country unrecorded and escaped royalty payment.

#### Gold Production in the Yukon, and Royalty Collected.†

Fiscal Year.	Total gold production.	Total exemption.	Royalty collected on.	Royalty paid.
	\$	\$	\$	\$
1898	3,072,773	338,815	2,732,928	273,290
1899	7,582,283	1,689,657	5,888,726	588,261
1900	9,863,464	2,561,744	7,307,120	730,777
1901	9,162,082	1,927,666	7,236,322	592,666
1902	9,566,340	1,193,114	8,367,225	331,451
1903	12,113,015		12,113,015	302,891
1904	10,790,663		10,790,663	272,211
1905	8,222,054		8,222,054	206,771
1906	6,540,007		6,540,007	163,000
1907 (9 months)	3,304,791		3,304,791	82,621
1908	2,820,162		2,820,162	70,507
1909	3,260,282		3,260,282	81,507
1910	3,594,251		3,594,251	89,847
1911	4,126,728		4,126,728	103,167

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



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89,844  
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f the Interior.

## LEAD.

The following statistics of the production of lead in Canada in 1911 are based on direct smelter returns and represent the amount of lead refined in Canada and shipped as pig lead or manufactured products.

The 1911 output was almost entirely from the mines of British Columbia, and a considerable decrease is shown, the production being 23,784,969 pounds in that year, against 32,987,508 for 1910. A small shipment was made from Quebec, but in regard to this figures are not obtainable.

In valuing the lead production for 1911, the average price per pound at Montreal has been used. The New York market is practically closed to Canadian lead by high tariff, and to the London market price must be added the freight, etc., to reach the Canadian market. The price at Montreal or Toronto is lower than that at New York, 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:—

LEAD. TABLE I.  
Annual Production.

Calendar Year.	Lbs.	Price per lb.	Value.	Calendar Year.	Lbs.	Price per lb.	Value.
		Cts.	\$			Cts.	\$
1887.....	204,800	5 400	9,216	1900.....	63,163,821	4 370	2,760,521
1888.....	674,500	4 420	29,812	1901.....	51,900,958	4 334	2,249,387
1889.....	165,100	3 930	6,488	1902.....	22,956,381	4 069	934,065
1890.....	105,000	4 480	4,704	1903.....	18,139,283	4 237	768,562
1891.....	88,665	4 350	3,857	1904.....	37,531,244	4 309	1,617,221
1892.....	808,421	4 090	33,064	1905.....	56,864,915	4 707	2,676,632
1893.....	2,135,923	3 730	79,636	1906.....	54,608,217	5 677	3,089,187
1894.....	5,703,222	3 290	187,636	1907.....	47,738,703	5 325	2,542,086
1895.....	16,441,794	3 230	531,716	1908.....	43,195,733	4 200	1,814,221
1896.....	21,199,977	2 980	721,159	1909.....	45,857,424	*3 620	1,692,139
1897.....	39,048,219	3 580	1,396,853	1910.....	32,987,508	3 687	1,216,249
1898.....	31,915,319	3 780	1,206,399	1911.....	23,784,969	13 480	827,717
1899.....	21,862,436	4 470	977,250				

\* 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*.  
† 1911 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 Bett's Electrolytic Process is now operated at Trail, B.C., in connexion with the smelter there, and has witnessed frequent enlargements until it is now treating the base bullion pro-

duced from the smelting of practically all the British Columbia lead ores at the Trail smelter.

Pig lead, fine gold, fine silver, refined antimony, copper sulphate, and bismuth metal are produced at the refinery, and lead pipe is also manufactured there. The refined lead finds a market in Canada, the United States, and the Orient. Of that used in Canada a great part is consumed in the manufacture of white lead, for which the Trail product is especially valuable on account of its purity.

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

Year.	Refined lead produced.	Year.	Refined lead produced.
1904 .....	7,519,440	1908 .....	36,549,274
1905 .....	15,804,607	1909 .....	41,883,714
1906 .....	29,471,314	1910 .....	32,987,508
1907 .....	26,607,461	1911 .....	25,784,969

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

The average price for soft lead in 1911, on the London market, was £13 19s. 3d. per long ton (equivalent to 2.992 cents per pound), as compared with £13 19s. (2.775 cents per pound) in 1910, and £13 1s. 8d. (2.803 cents per pound) in 1909.

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 1911 was 3.480 cents per pound against 2.992 in London and 4.420 in New York.

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

## Price of Pig Lead at Montreal.\*

Month.	1907.	1908.	1909.	1910.	1911.
January.....	4 94	3 67	3 35	3 48	3 31
February.....	1 88	3 60	3 38	3 49	3 32
March.....	4 92	3 54	3 42	3 34	3 34
April.....	4 92	3 44	3 35	3 21	3 26
May.....	4 84	3 21	3 26	3 13	3 29
June.....	4 93	3 11	3 23	3 15	3 27
July.....	4 98	3 17	3 12	3 13	3 33
August.....	4 69	3 31	3 08	3 11	3 45
September.....	4 85	3 24	3 14	3 11	3 63
October.....	4 56	3 29	3 26	3 23	3 77
November.....	4 25	3 42	3 28	3 34	3 93
December.....	3 65	3 37	3 34	3 35	3 95
Average.....	4 701	3 364	3 268	3 246	3 480

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

The average monthly prices of lead in New York as quoted in the 'Engineering and Mining Journal' are shown in the next table.

## Monthly Average Prices of Lead in New York, in cents per pound.

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
January.....	4 35	4 000	4 075	4 347	4 532	5 600	6 000	3 691	4 175	4 790	4 483
February.....	4 35	4 075	4 075	4 375	4 450	5 404	6 000	3 725	4 018	4 613	4 449
March.....	4 35	4 075	4 442	4 475	4 470	5 350	6 000	3 838	3 986	4 159	4 394
April.....	4 35	4 075	4 567	4 475	4 500	5 404	6 000	3 993	4 168	4 376	4 412
May.....	4 35	4 075	4 325	4 423	4 500	5 685	6 000	4 253	4 287	4 315	4 373
June.....	4 35	4 075	4 210	4 196	4 500	5 750	5 760	4 466	4 350	4 343	4 435
July.....	4 35	4 075	4 075	4 192	4 524	5 750	5 288	4 447	4 321	4 404	4 499
August.....	4 35	4 075	4 0 5	4 111	4 665	5 750	5 250	4 580	4 363	4 400	4 500
September.....	4 35	4 075	4 243	4 290	4 850	5 750	4 813	4 515	4 342	4 400	4 485
October.....	4 35	4 075	4 375	4 200	4 850	5 750	4 750	4 351	4 341	4 400	4 265
November.....	4 35	4 075	4 218	4 200	5 200	5 750	4 376	4 330	4 370	4 442	4 298
December.....	4 15	4 075	4 162	4 600	5 422	5 900	3 658	4 213	4 560	4 500	4 450
Average.....	4 33	4 069	4 237	4 309	4 707	5 657	5 325	4 290	4 273	4 446	4 429

The average monthly prices of soft lead in London, England, as published by Julius Matton of London, and 'Metallgesellschaft' of Frankfurt-on-the-Main were, from 1902 to 1911, as follows:

**Average Monthly Prices of Lead in London. £ per long ton.**

Month.	1902.			1903.			1904.			1905.			1906.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	10	11	3	11	6	1	11	11	2	12	17	6	16	17	
February	11	12	4	11	11	2	11	11	10	12	9	3	16	0	
March	11	10	2	13	1	6	12		9	12	5	11	15	17	
April	11	11	11	12	8	1	12	5	1	12	13	2	15	16	
May	11	12		11	16		11	15	11	12	15	3	16	13	
June	11	5	5	11	8	9	11	10	5	13			16	15	
July	11	1	8	11	7	8	11	13	1	13	12	2	16	11	
August	11	2	5	11	2	11	11	14	9	13	19	2	17	1	
September	10	17	10	11	3	1	11	15	9	13	19		18		
October	10	14	11	11	2	2	12	3	9	14	13	7	19	7	
November	10	14	4	11	2	2	12	17	19	15	6	9	19	5	
December	10	15	1	11	3	7	12	15	6	17	1		19	12	
Yearly average	11	5	3	11	11	7	11	19	8	13	14	5	17	7	

Month.	1907.			1908.			1909.			1910.			1911.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	19	16	8	14	10	6	11	3	6	13	3	11	13		
February	19	11	6	14	5	6	13	5	5	13	7	3	13	1	
March	19	14	7	11	1	4	13	8	8	13	2	9	13	2	
April	19	16	4	13	13	10	13	7		12	13	9	12	18	
May	19	17	7	13	2	7	14	5	3	12	11	8	12	19	
June	20	6		12	15	7	13	2	4	12	13	9	13	5	
July	20	8	2	12	19	6	12	13	1	12	11	8	13	10	
August	19	5	3	13	9	10	12	10	6	12	10	10	14	1	
September	19	17	6	13	3	6	12	15	3	12	12	6	14	15	
October	18	13		13	7	3	13	4	4	13	2		15	6	
November	17	4	11	13	12	2	13	1	1	13	4	6	15	15	
December	14	9	4	13	3	6	13	2	11	13	3	9	15	13	
Yearly average	19	4	10	13	10	5	13	4	8	12	19		13	19	

*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 lbs., 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, together with the regulation based upon it, is reproduced herewith in full.

ACT 78 EDWARD VII., CHAPTER 43.

AN ACT RESPECTING THE PAYMENT OF BOUNTIES ON LEAD CONTAINED IN LEAD-BEARING ORES MINED IN CANADA.

*Assented to July 20th, 1908.*

Whereas under the provisions of an Act passed on the 21st day of October, 1903, being chapter 31 of the Acts of 1903, payment of a bounty on lead contained in lead-bearing ores mined in Canada, not to exceed five hundred thousand dollars in any fiscal year, was authorized to be paid until the thirtieth day of June, 1908, and whereas the total amount of bounty paid thereunder up to the thirty-first day of March, 1908, was six hundred and sixty-seven thousand four hundred and four dollars, and it is estimated that a further amount of forty-five thousand dollars will be payable on or before the thirtieth day of June, 1908, leaving unexpended about one million seven hundred and eighty-eight thousand and seventy-eight dollars of the total amount authorized to be paid under the provisions of the said chapter 31: Therefore, His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. 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, 1908, 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 five hundred 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 shillings sterling per ton of two thousand two hundred and forty pounds, such bounty shall be reduced by the amount of such excess.

The total amount of bounty payable under the provisions of chapter 31 of the Acts of 1903, and of this Act, shall not exceed two million five hundred thousand dollars.

2. 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

published  
-the-Main,

on.

1906.

£	s.	d.
16	17	6
16	0	4
15	17	3
15	16	6
16	13	6
16	15	6
16	11	7
17	1	3
18	1	1
19	7	9
19	5	6
19	12	6
17	7	

1911.

£	s.	d.
13	1	8
13	1	11
13	2	11
12	18	5
12	19	2
13	5	5
13	16	11
14	1	1
14	15	1
15	6	1
15	15	5
15	13	4
13	13	3

ment, to  
the produc-  
restrictions  
and smelted  
in London,  
should be  
in the price  
ed. As the  
considerable  
is compara-

paid at the close of the fiscal year, upon evidence that all such ore has been smelted in Canada.

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 thirty-three thousand three hundred and thirty-three tons of two thousand pounds, the rate of bounty shall be reduced to such sum as will bring the payments for the year within the limit mentioned in section 1.

3. 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.

4. 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.

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

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

REGULATIONS under the provisions of the Act 7-8, Edward VII, Chapter 1, intitled: "An Act to provide for the payment of Bounty on Lead contained in the lead-bearing ores mined in Canada."

(As authorized by Order in Council on the 3rd August, 1908.)

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 make 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 ores shall at all times be under the supervision of the officer 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 day not to be later than the last day of the calendar month during which the ore was unloaded from cars at 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 1912.

Year ending	Bounty paid.	Year ending.	Bounty paid
	\$		\$
June 30, 1899	76,665	March 31, 1907 (9 mos.)	1,395
" 30, 1900	13,335	" 31, 1908	51,001
" 30, 1901	30,000	" 31, 1909	307,433
" 30, 1902		" 31, 1910	340,542
" 30, 1903	4,380	" 31, 1911	248,531
" 30, 1904	195,627	" 31, 1912	179,288
" 30, 1905	330,645		
" 30, 1906	90,196	Total	1,809,641

*Exports and Imports.*—According to Trade and Navigation reports, the total quantity of lead contained in ore and concentrates, and pig lead, exported, during the calendar year 1911, was 137,061 pounds, valued at \$4,632, as compared with 7,759,053 pounds, valued at \$249,482, in 1910.

Details of exports, 1908 to 1911, are as follows:—

## Exports of Lead, 1908 to 1911.

	LEAD IN ORE, CONCENTRATES, ETC.		PIG LEAD.	
	Lbs.	Value.	Lbs.	Value.
1908.		\$		\$
To United States.....	719,086	20,514	168,866	5,325
To other countries.....	3,792,845	132,880	13,773,797	463,731
Total.....	4,511,931	153,394	13,942,663	469,056
1909.				
To United States.....	6,096,852	126,478	280	8
To other countries.....	129,216	6,100	11,301,680	361,958
Total.....	6,226,068	132,578	11,301,960	361,966
1910.				
To United States.....	46,800	1,308	59,905	2,290
To other countries.....			7,652,648	245,878
Total.....	46,800	1,308	7,712,553	248,168
1911.				
To United States.....	65,100	1,826	71,961	2,800
To other countries.....				
Total.....	65,100	1,826	71,961	2,800

The exports of lead since 1873 are shown in Table 2:—

LEAD. TABLE 2.

## Exports of Lead.

Calendar Year.	Lbs.	Value.	Calendar Year.	Lbs.	Value.
		\$			\$
1873.....		1,993	1893.....		3,090
1874.....		127	1894.....	5,792,700	144,500
1875.....		7,510	1895.....	23,075,892	435,070
1876.....		66	1896.....	26,480,320	462,000
1877.....		720	1897.....	43,802,697	925,140
1878.....			1898.....	37,375,678	885,480
1879.....		230	1899.....	15,799,518	466,900
1880.....			1900.....	57,642,029	1,917,600
1881.....			1901.....	45,590,995	1,804,680
1882.....		32	1902.....	17,761,484	457,120
1883.....		5	1903.....	18,624,303	426,480
1884.....		36	1904.....	25,868,825	559,480
1885.....			1905.....	41,657,403	1,016,500
1886.....			1906.....	21,436,022	736,000
1887.....		724	1907.....	25,591,883	1,029,880
1888.....		18	1908.....	18,454,594	622,480
1889.....		18	1909.....	17,528,028	493,600
1890.....			1910.....	7,759,953	249,480
1891.....		5,000	1911.....	137,061	4,600
1892.....		2,569			







LEAD.—TABLE 4.

## Imports of Lead Manufactures.

TOTAL.		Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	Value.	1880	\$ 15,400	1891	\$ 23,898	1902	\$ 120,020
298	124,117	1881	22,629	1892	22,636	1903	134,151
458	127,663	1882	17,282	1893	33,783	1904	129,093
195	156,598	1883	25,556	1894	29,361	1905	147,177
371	177,544	1884	31,361	1895	38,015	1906	163,793
113	131,871	1885	36,340	1896	50,722	1907	162,425
468	111,434	1886	33,078	1897	60,735	1908	243,925
738	139,895	1887	19,140	1898	63,179	1909	213,167
313	215,223	1888	18,816	1899	91,497	1910	234,930
635	242,745	1889	16,315	1900	104,736	1911	235,248
396	256,614	1890	25,600	1901	107,260		
280	342,580						
928	291,253						
674	2-6,752						
888	247,807						
709	169,891						
000	15,605						
008	196,331						
795	187,556						

LEAD.—TABLE 5.

## Imports of Litharge.

TOTAL.		Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
634	209,820	1880	3,011	\$ 14,331	1891	7,379	\$ 27,613	1902	13,002	\$ 17,021
455	323,265	1881	6,126	22,129	1892	10,381	34,343	1903	13,921	17,751
854	251,325	1882	4,900	16,651	1893	7,685	24,401	1904	9,894	32,633
616	175,327	1883	1,532	6,173	1894	38,547	28,685	1905	17,865	57,736
875	153,933	1884	5,235	18,132	1895	11,955	32,953	1906	10,165	39,836
065	103,219	1885	4,990	16,156	1896	10,710	32,817	1907	11,311	49,183
704	160,899	1886	4,928	16,063	1897	12,028	34,538	1908	19,052	99,785
866	185,747	1887	6,397	21,865	1898	10,416	32,904	1909	12,117	43,597
835	328,290	1888	7,010	23,808	1899	9,539	31,518	1910	18,101	62,174
285	331,100	1889	8,089	31,382	1900	9,1	176	1911	16,543	59,987
174	359,790	1890	9,453	31,491	1901	11,1	4			
864	197,266									
695	228,975									
242	389,471									

The imports of white and red lead and orange mineral, in 1911, amounted to 4,072,433 pounds, valued at \$169,501. In 1903, the imports were 19,208,786 pounds, the falling off being due to the establishment of corroding works at Montreal.

Detailed statistics of imports of lead pigments during the calendar years 1909, 1910, and 1911, are as follows; the statistics of imports since 1885 being shown in Table 6:—

total at price of

## Imports of White and Red Lead in 1909, 1910, and 1911.

	CALENDAR YEAR 1909.		CALENDAR YEAR 1910.		CALENDAR YEAR 1911.	
	Lbs.	Value.	Lbs.	Value.	Lbs.	Value.
		\$		\$		\$
Lead, white, dry .....	2,690,575	95,894	2,076,629	75,403	1,467,193	58,300
Lead, white, ground in oil. ....	730,001	32,678	811,510	37,475	1,033,732	46,900
Lead, red, dry and orange mineral.....	516,032	25,341	881,788	31,803	1,571,508	64,100
	3,936,608	153,913	3,769,927	144,741	4,072,433	169,500

LEAD.—TABLE 6.

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

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$
1885 .....	5,540,753	198,913	1899 .....	14,597,945	514,842
1886 .....	6,703,077	213,258	1900 .....	14,679,920	634,492
1887 .....	6,998,820	233,722	1901 .....	10,241,601	461,368
1888 .....	6,361,334	216,654	1902 .....	15,584,164	603,582
1889 .....	7,066,465	267,236	1903 .....	19,208,786	758,371
1890 .....	10,859,672	381,959	1904 .....	16,925,585	662,098
1891 .....	8,560,615	337,407	1905 .....	17,376,588	638,381
1892 .....	10,288,766	351,686	1906 .....	10,412,891	417,444
1893 .....	10,865,183	364,680	1907 .....	5,956,626	290,629
1894 .....	10,958,170	353,053	1908 .....	7,850,860	420,537
1895 .....	8,780,052	282,353	1909 .....	4,687,416	195,258
1896 .....	11,711,496	367,569	1910 .....	3,585,921	141,114
1897 .....	10,310,463	347,539	1911 .....	3,967,091	161,897
1898 .....	12,682,808	448,659			

The production of refined lead as already shown was, in 1911, 11,892 tons while the exports of lead were 69 tons, leaving 11,823 tons as the consumption of Canadian lead.

The imports of lead during the calendar year 1911 are shown above to have been 15,631 tons, not including certain manufactures of lead valued at \$108,019 so that the total consumption of lead in 1911 probably exceeded 27,500 tons.

## Nova Scotia.

There was no production from this Province during the year. Some prospecting and development were done near Musquodoboit.

**Quebec.**

A small shipment is reported from Calumet island, but no details are obtainable.

**Ontario.**

There has been no production from this Province during the year, but the reopening of some of the older mines gives promise of a production in the future.

**British Columbia.**

As already stated almost all the production in 1911 was from British Columbia mines, and there was a decrease from the previous year as shown by Table 7 following:—

LEAD.—TABLE 7.

**British Columbia:—Production.**

Calendar Year.	Lbs.	Value.	Price per pound.	Calendar Year.	Lbs.	Value.	Price per pound.
		\$	Cts.			\$	Cts.
1887.....	204,800	9,216	4 40	1900.....	63,158,621	2,760,031	4 370
1888.....	674,500	29,813	4 42	1901.....	51,582,906	2,235,603	4 334
1889.....	165,100	6,488	3 93	1902.....	22,536,381	917,005	4 069
1890.....	Nil.			1903.....	18,089,283	766,443	4 237
1891.....	Nil.			1904.....	36,646,244	1,579,086	4 309
1892.....	808,420	33,064	4 09	1905.....	56,580,703	2,663,254	4 707
1893.....	2,131,092	79,190	3 73	1906.....	52,408,217	2,464,733	5 657
1894.....	5,703,222	187,636	3 29	1907.....	47,738,703	2,542,086	5 325
1895.....	16,461,794	531,716	3 23	1908.....	43,195,733	1,814,221	4 200
1896.....	24,199,977	721,159	2 98	1909.....	45,857,424	1,692,139	*3 690
1897.....	38,841,136	1,390,513	3 58	1910.....	32,987,508	1,216,249	3 687
1898.....	31,693,559	1,198,017	3 78	1911.....	23,784,969	827,717	†3 480
1899.....	21,862,436	977,250	4 470				

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

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

AR YEAR 1911.

Value.
\$
58,335
46,986
64,180
169,501

White Lead

Value.
\$
514,842
634,492
461,368
603,582
758,371
602,098
638,381
417,444
290,629
420,537
195,258
141,114
161,897

892 tons;

assumption

re to have

\$108,019

tons.

ome pros-

LEAD. TABLE 8.

## British Columbia:—Production by Districts.\*

	1905.	1906.	1907.	1908.	1909.	1910.	1911.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Cassiar. . . . .	5,500					1,695	238,578
East Kootenay —							
Fort Steele. . . . .	48,248,828	44,487,481	37,526,194	30,204,788	27,001,528	23,874,562	17,158,069
Other districts. . . . .	119,584	167,691	73,842	558,270	18,724	66,610	
West Kootenay —							
Ainsworth. . . . .	1,002,114	3,173,353	3,654,775	1,790,216	10,298,313	2,558,353	289,009
Nelson. . . . .	1,368,388	1,034,553	1,582,113	315,424	1,097,069	1,215,814	1,928,836
Slocan. . . . .	5,399,330	2,975,674	4,365,826	6,572,268	4,976,199	6,466,358	6,795,571
Other districts. . . . .	339,883	469,060	570,534	908,552	979,916	470,241	522,615
Yale. . . . .	67,976	190,165	25,419	21,215	21,567	35,581	23,719
	56,580,703	52,498,217	47,733,703	43,195,733	41,396,346	34,658,746	26,872,397

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

The falling off in the output of this Province is the result of a number of causes.

The Slocan forest fires of 1910 by their interruption of traffic caused a cessation or decrease of shipments from several important properties. Then, too, the heavy decrease caused by the working out of the St. Eugene has not been entirely counteracted by the tonnage from the Sullivan. There are, however, several features of promise: the approaching completion of the Bear Lake Branch of the Canadian Pacific railway and its extension to Kaslo; the increased activity in the Slocan among the larger properties and the reopening of many of the older mines; the activity of the Consolidated Mining and Smelting Co. in Ainsworth and Sheep Creek camps, and the renewal of work at the Blue Bell mine, all pointing to increase in the lead production in the near future.

## NICKEL.

The mining and metallurgical treatment of the nickel-copper ores of the Sudbury district of Ontario has become one of the most important of Canada's metal mining industries, and special interest is attached to this industry because of the fact that these deposits at the present time supply a very large portion of the world's demand for nickel, and also because the present known available supplies of ore in the district appear to be sufficient for many years' operations. Additional interest is now lent to these ores by the discovery of the valuable properties possessed by the new alloy of nickel and copper recently introduced to commerce under the name of monel metal, of which some particulars were given in the report for 1908.

These nickel-copper ore deposits have already been the subject of special reports<sup>1</sup> by the Geological Survey at Ottawa, and the Ontario Bureau of Mines at Toronto, to which reference may be made for comprehensive descriptions of the geology of the district.

The production of ore and its reduction to a bessemer matte, was carried on during 1911 to a less extent than in the previous year. There were mined during the year 612,511 tons of ore, much of which is subjected to open air heap roasting before being smelted. There were smelted 610,834 tons, from which were produced 32,607 tons of Bessemer matte, carrying approximately 17,049 tons of nickel and 8,966 tons of copper. The net value of the matte was returned as \$4,945,592. The matte, which is shipped to the United States and Great Britain for refining, carries from 77 to 82 per cent of the combined metals, having averaged for the past year 52.3 per cent of nickel and 27.5 per cent in 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 from this special matte without the intermediate refining of either the nickel or copper.

Compared with 1910, there was a decrease in matte production, in 1911, of 2,426, or 6.9 per cent, and the decrease in total nickel content of matte was 1,587 tons, or 8.5 per cent. The total copper content of the matte was 8,966 tons, a decrease of 664 tons, or 6.9 per cent from the previous year.

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

<sup>1</sup> No. 873. Report on nickel and copper deposits of Sudbury, Ont., by A. E. Barlow, Geological Survey, Canada, 1901.  
The Sudbury Nickel Region, by A. P. Coleman, Bureau of Mines, Vol. XIV, part III, 1904.

	1908.	1909.	1910.	1911.
	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.	Tons of 2,000 lbs.
Ore mined.....	409,551	451,892	652,392	612,511
Ore smelted.....	369,180	462,336	628,947	610,834
Bessemer matte produced.....	21,197	25,845	35,433	32,607
Copper content of matte shipped.....	7,503	7,873	9,530	8,966
Nickel " ".....	9,572	13,141	18,636	17,049
Spot value of matte shipped.....	\$2,930,989	\$3,913,017	\$5,380,064	\$4,945,592
Wages paid.....	1,284,265	1,234,904	1,698,152	1,830,526
Men employed.....	1,690	1,573	1,882	1,885

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

	1907.	1908.	1909.	1910.	1911.
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
To Great Britain.....	2,518,338	2,554,486	3,843,763	5,335,331	5,023,393
To United States.....	16,857,997	16,865,407	21,772,635	30,679,451	27,596,578
	19,376,335	19,419,893	25,616,398	36,014,782	32,619,971

The above figures of production do not include the nickel content of the silver-cobalt ores from the Cobalt district, of which it is difficult to obtain complete statistics. The shippers of silver-cobalt ores receive no return for the nickel content, although this metal forms an important constituent of the ore and is possibly, to some extent, saved by the refiners. Plants have been established by the Coniagas Reduction Company at Thorold, and the Deloro Mining and Reduction Company at Deloro, for the recovery of nickel and cobalt oxides.

During 1911, there were shipped from the cobalt-silver smelting works of Ontario, 154,174 pounds of cobalt oxide and nickel oxide, and 1,260,832 pounds of mixed cobalt and nickel oxides and cobalt material having a total value of \$221, '90.

*Bounty on Refined Nickel and Nickel Oxide.*—Under the terms of "The Metal Refining Bounty Act," 1907<sup>1</sup> 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).

The sections affecting nickel 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-

<sup>1</sup> The full text of the Act and Amendment will be found in the chapter on Cobalt.



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.”

In March 1912, the Act was amended to cover a further period of five years.

The price of refined nickel in New York during 1911 was quoted at from 40 to 45 cents per pound. The quotations at the end of December being “large lots contract basis 40 to 45 cents a lb. Retail spot from 50 cents for 500 lb. lots up to 55 cents for 200 lb. lots. The price of electrolytic is 5 cents higher.” During 1910 the price of refined nickel was quoted in New York at from 40 to 45 cents per pound according to size and terms of order.

Statistics of the quantities of nickel contained in matte produced are shown in the following table, the values being based on the final value of the metal, either as refined or monel metal.

Statistics of the quantities of ore mined and smelted, matte produced, etc., will be found in the chapter on smelter production.

NICKEL.—TABLE 1.

Annual Production.

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 .....	780,477	60	498,286	1901 .....	9,189,047	50	4,594,523
1890 .....	1,435,742	65	933,232	1902 .....	16,693,410	47	5,025,903
1891 .....	4,035,347	60	2,421,208	1903 .....	12,505,510	40	5,002,204
1892 .....	2,413,717	58	1,399,956	1904 .....	10,547,888	40	4,219,153
1893 .....	3,982,982	52	2,071,151	1905 .....	18,876,315	40	7,550,526
1894 .....	4,907,430	38 <sup>1</sup>	1,870,958	1906 .....	21,490,955	42	8,948,834
1895 .....	3,888,525	35	1,360,984	1907 .....	21,189,793	45	9,535,407
1896 .....	3,397,113	35	1,188,990	1908 .....	19,143,111	43	8,231,538
1897 .....	3,997,647	35	1,399,176	1909 .....	26,282,091	36	9,461,877
1898 .....	5,517,690	33	1,820,838	1910 .....	37,271,033	30	11,181,310
1899 .....	5,744,000	36	2,067,840	1911 .....	34,098,744	30	10,229,623
1900 .....	7,080,227	47	3,327,707				

<sup>1</sup> Calculated from shipments made by rail.

The companies engaged in mining and smelting nickel ores are:—

The Canadian Copper Company (The International Nickel Company) of Copper Cliff, Ont., and New York.

The Mond Nickel Company, Victoria Mines, Ont., and London, England.

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 the ores shipped from this district has been estimated by the Ontario Bureau of Mines as follows:—

Year.	Ore shipped. Nickel content	
	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	601
1911.....	26,653	392

A large portion of these ores, particularly the high grade, is now being reduced at Copper Cliff, Thorold, and Deloro, and as already mentioned cobalt and nickel oxides are being recovered in addition to silver bullion and white arsenic.

Statistics of the exports of nickel as compiled from the Customs Department's reports are shown in Table 2, and the imports in Table 3.

NICKEL.—TABLE 2.

Exports of Nickel contained in Ore, Matte, or other Product.

Calendar Year.	Value.	Calendar Year.	Lbs.	Value.
	8			8
1890.....	89,568	1904.....	12,691,227	1,116,099
1891.....	667,280	1904.....	11,233,869	1,091,349
1892.....	293,149	1905.....	17,318,059	1,569,693
1893.....	629,692	1906.....	20,653,845	2,042,965
1894.....	559,356	1907.....	19,276,335	2,280,374
1895.....	521,783	1908.....	19,419,893	1,866,624
1896.....	658,213	1909.....	25,616,398	2,676,483
1897.....	723,130	1910.....	36,014,782	4,030,040
1898.....	1,019,363	1911.....	32,619,971	3,676,396
1899.....	939,915			
1900.....	1,031,030			
1901.....	751,080			
1902.....	1,007,211			

NICKEL. TABLE 3.  
Imports of Nickel and Nickel Anode.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	£		£		£
1890	3,151	1898	5,882	1906	15,076
1891	3,889	1899	9,410	1907	19,511
1892	3,208	1900	4,988	1908	36,879
1893	2,905	1901	12,029	1909	11,630
1894	3,528	1902	15,418	1910	24,266
1895	4,267	1903	26,177	1911	22,000
1896	4,787	1904	11,682		
1897	4,737	1905	19,076		

During the calendar year 1911 there was an import of "nickel, nickel-silver, and German silver in ingots or blocks" to the extent of 121,710 pounds, valued at \$30,736, and "nickel in bars and rods" 490,774 pounds, valued at \$116,579.

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

**Exports of Nickel Ore from New Caledonia.<sup>1</sup>**

Year.	Metric tons.	Year.	Metric tons.	Year.	Metric tons.
1898	53,290	1903	77,369	1908	108,000
1899	103,968	1904	98,655	1909	86,000
1900	140,319	1905	125,289	1910	99,000
1901	133,814	1906	118,890		
1902	129,653	1907	120,103		

<sup>1</sup> Statistique de l'Industrie Minière en France et en Algérie, Paris.

The nickel ore of New Caledonia carries about 6½ per cent of nickel.

Practically all of the above ore is smelted in France, Germany, and England.

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

£
1,116,099
1,991,349
1,569,193
2,042,965
2,280,374
1,866,624
2,676,483
4,630,040
3,676,396

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

Producing country.	1903	1904	1905	1906	1907	1908	1909	1910	1911
United States of North America and Canada	5,100	6,000	4,500	6,500	6,500	7,000	9,000	10,000	12,000
England	1,700	2,200	3,100	3,200	3,200	3,000	3,200	3,500	4,500
Germany <sup>1</sup>	1,000	2,000	2,700	2,800	2,600	3,000	3,500	4,500	5,000
France	1,500	1,800	2,200	1,800	1,800	1,400	1,200	1,500	2,000
Other countries						200	400	600	1,000
Total production <sup>2</sup>	9,300	12,000	12,500	14,300	14,100	14,600	17,300	20,100	24,500

<sup>1</sup> 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.

<sup>2</sup> The entire production of nickel, apart from quite insignificant quantities obtained in Germany, Norway, and the United States of America, comes from New Caledonian and Canadian ores.

Statistics of the average yearly prices of nickel in Europe are also given by the same authority 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.
1880	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 80	41 0	1905	3 30	35 6
1894	3 60	38 0	1906	3 80	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			

Mark = 23 8 cents.      Kilogram = 2 20462 lbs.

## SILVER.

Owing to the rapid development of the Cobalt silver camp in Ontario during the past five years, the production of silver in Canada has, in point of value, taken second place in the list of our mineral productions, being exceeded only by coal.

The total production of silver in 1911, including that produced as bullion and the metal estimated as recovered from ores sent to smelters or otherwise treated, was reported as 32,559,044 fine ounces, which, compared with a production of 32,869,264 ounces in 1910, shows a decrease of 0.94 per cent.

The average value of fine silver in 1911, according to New York quotations, was 53.304 cents per ounce, as compared with an average value of 53.186 cents in 1910, a decrease of about 0.31 per cent.

The total value of the silver production in 1911 was \$17,355,272, a decrease of \$225,183, or 1.28 per cent over the value, \$17,580,455, in 1910.

A comparison of the production of 1910 and 1909, shows an increase for 1910 of 5,339,791 ounces, or 19.4 per cent in quantity, and \$1,401,951, or 21 per cent in value, the average price in 1910 having increased about 3.85 per cent from 1909.

Statistics of the annual production of silver since 1887 are shown in Table 1.

SILVER. TABLE 1.  
Annual Production, 1887-1911.

Year.	Ozs.	Value.	Average price.		Year.	Ozs.	Value.	Average price.	
			per oz.	per oz.				per oz.	per oz.
		\$	Cts.			\$	Cts.		
1887	355,083	7,271	98.00	1901	4,468,225	2,740,362	61.33		
1888	437,232	410,998	94.00	1902	5,539,192	3,265,354	58.95		
1889	383,318	358,785	93.60	1903	4,291,317	2,238,351	52.16		
1890	400,687	419,118	104.60	1904	3,198,581	1,709,642	53.45		
1891	414,523	409,549	98.00	1905	3,577,526	2,047,195	57.22		
1892	310,651	272,130	87.00	1906	6,000,023	3,621,133	60.35		
1893		330,128	77.00	1907	8,473,379	5,159,455	60.79		
1894	847,697	531,049	63.00	1908	12,779,799	8,348,659	65.33		
1895	1,578,275	1,030,299	65.28	1909	22,106,233	11,686,239	62.86		
1896	3,205,343	2,149,503	67.06	1910	27,529,473	14,178,504	51.50		
1897	5,558,456	3,323,395	59.79	1911	32,559,044	17,355,272	53.49		
1898	4,452,333	2,503,929	56.26						
1899	3,411,644	2,032,658	59.58						

From 1887 to 1893, the production ranged in value between \$500,000 and \$100,000, and was derived chiefly from the Provinces of Ontario and Quebec. The next three years saw a rapid increase in the production due to the development of the silver-lead ore deposits in British Columbia, and in 1896 a production of over \$2,000,000 is recorded. From that year until 1905 the production

varied from \$2,000,000 to \$3,500,000, rising rapidly during the next six years to \$17,355,272 in 1914, as a result of the discovery of the rich ores of the Cobalt district. Ontario, in 1905, produced 40.9 per cent of the total output. In 1911 the production obtained from Ontario was 93.8 per cent, and was practically all from the Cobalt district, the contribution of British Columbia being almost 5.8 per cent.

Statistics of the annual production in each province are separately shown in Table 2.

SILVER.—TABLE 2.  
Production by Provinces, 1887-1911.

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	17,620	17,301		
1888.....	208,004	195,580	149,388	140,425	79,780	74,993		
1889.....	181,669	169,986	148,517	139,012	53,192	49,787		
1890.....	158,715	166,016	171,545	179,436	70,427	73,166		
1891.....	225,633	222,926	185,584	183,357	3,306	3,266		
1892.....	41,581	36,425	191,910	168,113	77,160	67,392		
1893.....		8,689		126,439		195,000		
1894.....			101,318	63,830	746,379	476,219		
1895.....			81,753	51,369	1,496,522	976,930		
1896.....			70,000	46,942	3,135,363	2,102,561		
1897.....	5,000	2,900	80,475	48,116	5,172,971	3,272,289		
1898.....	35,000	49,521	74,932	43,655	4,292,101	2,569,753		
1899.....	202,000	120,352	40,231	23,970	2,939,413	1,751,302	236,000	137,034
1900.....	161,650	99,140	58,400	35,817	3,958,175	2,427,548	290,000	177,857
1901.....	151,400	89,250	41,459	24,440	6,151,333	3,036,711	195,000	114,953
1902.....	145,000	75,632	42,560	22,168	3,917,917	2,043,586	185,900	96,985
1903.....	17,777	9,592	28,690	15,287	2,998,294	1,601,471	156,000	83,362
1904.....	296,875	118,376	15,000	8,583	3,222,481	1,843,935	133,170	76,201
1905.....	2,451,356	1,479,442	19,620	11,841	3,459,417	2,075,757	89,650	54,093
1906.....	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	64,668	42,522
1907.....	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,510
1908.....	19,308,545	10,254,817	13,269	7,630	2,631,389	1,391,058	63,000	33,304
1909.....	24,822,099	12,784,126	13,233	6,815	2,649,141	1,361,987	45,000	23,176
1910.....	30,396,366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46,756
1911.....	30,540,754	16,279,143	18,435	9,827	1,887,147	1,005,924	112,508	60,078

The average price of fine silver in New York during 1911 varied between a maximum of 55.7 cents per ounce in November, and a minimum of 52.1 cents per ounce in August, the average being 53.304 cents per ounce.

In London the average price of silver in 1911 was 24.592 pence per standard ounce of a fineness of 0.925. For the year 1910, the average price per fine ounce in New York was 53.486 cents, the highest being 55.6 cents in November, and the lowest 51.4 in March of that year.

The average monthly prices of silver in New York from 1906 to 1911, and in London during 1911, are shown in tabulated form following.

## Average Monthly Prices of Silver.

Months.	New York.—Cents per fine ounce.					London.— Pence per Standard ounce (a).
	1907.	1908.	1909.	1910.	1911.	1911.
January.....	68.673	55.678	51.750	52.375	53.795	21.865
February.....	68.835	56.000	51.472	51.534	52.222	21.681
March.....	67.519	55.365	50.468	51.454	52.745	21.324
April.....	65.462	54.505	51.428	53.221	53.325	21.595
May.....	65.981	52.795	52.805	53.870	53.308	21.583
June.....	67.090	53.663	52.538	53.462	53.043	21.486
July.....	68.144	53.115	51.043	54.150	52.630	21.286
August.....	68.745	51.683	51.125	52.912	52.171	21.082
September.....	67.792	51.720	51.449	53.295	52.440	21.209
October.....	62.435	51.431	50.923	55.490	53.340	21.594
November.....	58.677	49.647	50.703	55.635	55.719	25.649
December.....	54.565	48.769	52.226	54.428	54.905	25.349
Average for the year.....	65.327	52.864	51.503	53.486	53.304	21.592

(a) 925 parts fine.

Important quantities of silver are now 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, chiefly from the silver-lead ores of that Province, and is shipped to China, the United States, and to the Ottawa mint.

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

Year.	Fine ozs.	Year.	Fine ozs.
1904.....	551,450	1909.....	2,003,603
1905.....	1,088,328	1910.....	1,798,960
1906.....	1,263,809	1911.....	1,325,601
1907.....	1,631,122		
1908.....	1,956,039	Total.....	11,018,612

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

- The Canadian Copper Company at Copper Cliff, Ont.
- The Deloro Mining and Reduction Company, Deloro, Ont.
- The Coniagas Reduction Company, St. Catharines, Ont.
- Canada Refining and Smelting Company, Orillia, Ont.

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

United States and in England. The bullion shipped in 1907 contained 4,449,722 fine ounces of silver; in 1908, 11,168,689 ounces; in 1909, 14,385,985 ounces; and in 1910, 17,365,165 fine ounces. In 1911 these smelters produced 17,753,167 fine ounces, or 53.9 per cent of the total production of Ontario.

### Quebec.

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

### Ontario.

From a production valued at only \$118,376 in 1904, the silver output of the Province has grown to a value of over \$16,200,000 in 1911. Not only does it contribute almost 94 per cent of the total silver production of Canada, but it now forms a very appreciable part (estimated at over 13 per cent), of the world's production. According to returns received by this department, there were shipped during 1911, 15,417 tons of ore, and 9,329 tons of concentrates, or a total tonnage of 24,746 tons, having a value of \$14,271,964, besides silver bullion produced at the mines, carrying 3,766,022 fine ounces of silver.

The silver content of ore shipped was estimated as 20,065,621 ounces, or an average of 1,302 ounces per ton, and of the concentrates shipped 8,118,231 ounces, or an average of 870 ounces per ton; the total silver content of ore, concentrates, and bullion shipped from the mines being 32,949,874 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 five 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 30,540,754 ounces, and valued at \$16,279,443. No payments for cobalt content were reported.

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

#### Silver Ore and Bullion Shipments from Cobalt Mines, 1904-1911.

Year.	SHIPMENTS.		SILVER CONTENT.		SILVER IN OUNCES, PER TON.		Silver bullion shipments. Fine ounces	Total value of silver.
	Ore. Tons.	Concentrate. Tons.	Ore. Ozs.	Concentrate. Ozs.	Ore.	Concentrate.		
1904.....	158	.....	206,875	.....	1,309	.....	.....	\$ 118,376
1905.....	2,144	.....	2,451,356	.....	1,143	.....	.....	1,473,192
1906.....	5,335	.....	5,401,766	.....	1,013	.....	.....	3,607,894
1907.....	14,644	.....	9,982,363	.....	682	.....	.....	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

\* Included with ore.



As the camp has developed, the average grade of the ore shipped has gradually diminished, although the introduction of concentration plants in 1908, and their increased use has tended to keep the ore shipped up to a high standard.

With respect to the nickel-cobalt and arsenic contents of these ores, the mining companies have been paid for only a small portion of the cobalt content, and nothing for the nickel and arsenic; in fact in certain cases the last two are penalized, and in 1911 payment for even cobalt ceased.

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 content, while not identical, agree very closely with those given in the previous table.

**Total Production Cobalt Mines, 1904-1911.\***

Year.	ORE AND CONCENTRATE SHIPPED.	METALLIC CONTENT.			
		Nickel.	Cobalt.	Arsenic.	Silver.
		Tons.	Tons.	Tons.	Ozs.
1904.	158	14	16	72	206,875
1905.	2,144	75	118	549	2,451,356
1906.	5,335	160	321	1,440	5,401,766
1907.	14,788	370	739	2,912	10,033,311
1908.	25,624	612	1,224	3,612	19,437,875
1909.	30,677	766	1,533	4,294	25,897,825
1910.	34,282	604	1,098	4,807	130,645,181
1911.	26,653	392	852	3,806	31,507,791

\* As per Ontario Bureau of Mines.

† Bullion shipments from mines included.

Nearly 30 per cent of the ore shipped from Cobalt was treated in metallurgical works in Canada, and white arsenic is being produced therefrom, of which record will be found under smelter production.

While the greater number of the operating companies hold unrestricted titles to their properties, several are operated on a royalty basis on mining lands owned and leased by the Timi-kaming and Northern Ontario Railway Commission. Mr. Arthur A. Cole, Mining Engineer to the Commission, has in his annual report compiled some very interesting statistics covering the whole district with respect to ore shipments, concentration, power and labour, prices paid for ore, etc., from which the following tables and extracts have been freely drawn:—

## Ore Shipments from the Cobalt District for the Years 1904 to 1911.

Mine.	1904. to 1906.	1907.	1908.	1909.	1910.	1911.	Totals. 1904-1911.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Badger.....			88 80	36 85		27 10	27 10
Bailey.....	30 00			51 38	140 06	20 00	175 65
Beaver.....			536 90	618 86	1,185 77	790 81	982 25
Buffalo.....	1,193 60	1,241 54	10 00	8 50	48 40	1,275 19	6,081 86
Casey-Cobalt.....			223 89	517 88	885 92	622 85	344 64
Chambers-Ferland.....			761 04	566 82	3,29 40	281 30	2,250 54
City of Cobalt.....		50 61	187 99	339 01	285 62	22 40	1,989 17
Cobalt Central.....		77 33	225 97	95 47	296 80	2,111 32	2,729 56
Cobalt Lake.....			177 71	27 35	310 99	703 51	1,362 78
Cobalt Townsite.....		143 22				114 10	348 08
Colonial.....	15 00	40 38				178 60	7,392 52
Coniagas.....	452 62	2,417 37	610 25	806 93	1,261 46	1,813 89	7,392 52
Crown Reserve.....			657 35	3,167 52	2,814 25	977 52	7,616 44
Drummond.....	307 35	104 13	1,161 38	1,225 47	2,194 41	714 83	5,707 57
Foster.....	200 85	312 13	191 20	113 90			818 07
Green Meehan.....	37 03	98 39				102 98	238 40
†Hargrave.....	28 45				343 68	102 44	474 57
Hudson Bay.....		149 53	1,094 23	743 64	260 33	898 88	3,146 61
Imperial Cobalt.....		14 61					14 61
Kerr Lake.....	213 33	319 76	660 24	1,173 42	5,088 78	1,292 58	8,748 08
King Edward(Watts).....	19 00	31 12	338 19	146 58	134 12	20 00	680 01
LaRose.....	1,522 52	2,815 45	4,843 17	6,757 21	5,131 53	3,581 54	24,651 42
†Lawson.....	14 61	61 12					75 73
McKinley-Darragh.....	547 54	742 42	1,808 39	1,056 49	2,393 39	3,238 64	9,786 87
Nancy Helen.....		30 10	201 32	116 32			347 74
Nipissing.....	2,668 10	2,538 26	3,571 96	6,470 52	6,833 81	2,952 20	25,034 85
Nova Scotia.....	43 95	272 21	237 95	224 79			778 90
North Cobalt.....				6 87		3 00	9 87
O'Brien.....	140 50	1,491 61	3,459 51	1,419 11	608 57	628 44	7,747 74
Peterson Lake Leases (Little Nipissing).....			40 67	39 62	313 76	28 45	422 50
(Nova Scotia).....				121 15			121 15
Provincial.....			75 84		52 05	100 54	228 43
†Princess.....		3 93					3 93
Red Rock.....		45 71					45 71
Right of Way.....	46 25	129 37	750 04	1,608 99	981 41	666 06	4,182 12
Rochester.....					28 30		28 30
Silver Bar.....			0 58			2 72	3 30
Silver Cliff.....			160 44	149 06	156 84	92 30	558 64
Silver Leaf.....	9 00	46 36	197 03				252 39
Silver Queen.....	175 57	478 57	885 70	316 64			1,856 58
Timiskaming.....		204 32	795 20	852 14	1,119 12	855 60	3,826 38
Timiskaming-Cobalt.....	20 47	67 98					88 45
Trethewey.....	438 06	833 58	1,408 69	1,134 50	536 64	602 99	4,954 45
†University.....	171 28	60 23					231 51
Victoria.....			0 47				0 47
Violet.....	36 00						36 00
Waldman.....					38 81		38 81
Wyandoh.....					24 15		24 15
Total.....	8,331 08	14,851 34	25,362 10	29,942 99	33,976 97	24,921 71	137,386 26

† 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 with LaRose.

Shipments from the Cobalt District for the Calendar Year 1911.

Mine.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
Badger.....	93-21	182-87	21-87	27-10	60-73	31-25	31-50	247-08	30-38	59-38	.....	32-54	27-10
Bailey.....	121-83	122-77	127-10	91-60	108-45	88-88	130-60	96-01	53-38	122-29	.....	124-35	29-00
Beaver.....	64-35	19-00	64-15	16-65	5-19	63-45	64-40	64-70	40-00	32-00	.....	87-73	790-81
Buffalo.....	30-00	31-00	89-05	66-45	32-80	31-10	.....	.....	.....	.....	.....	196-90	1,275-19
Cassey-Cobalt.....	122-33	345-45	189-20	181-50	98-00	265-25	89-06	154-73	214-46	230-20	102-51	180-06	281-30
Chambers-Ferland.....	82-15	168-18	236-54	21-40	55-25	23-50	48-65	70-64	133-07	110-55	223-58	121-54	2,111-32
City of Cobalt.....	78-67	86-41	77-40	114-15	135-70	57-90	131-44	138-70	183-83	42-90	.....	.....	703-51
Cobalt Central.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	114-10
Cobalt Lake.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,813-80
Cobalt Township.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	91-35
Colonial.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,400-00
Comogas.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	48-92
Crown Reserve.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41-65
Drummond.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90-00
Green Meelan.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	714-83
Hargrave.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102-98
Huban Bay.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	888-88
Keey Lake.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21-89
King Edward.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	102-44
La Rose.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	898-88
McKinley-Darragh.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	111-47
Nipissing.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30-00
North Cobalt.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	277-24
O'Brien.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,581-54
Peterson Lake.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,298-64
Provincial.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,952-20
Ridge of Way.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3-00
Silver Bar.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	628-44
Silver Cliff.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	28-45
Tumskaming.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100-54
Trethewey.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	666-06
Total.....	1,886-35	2,101-62	1,815-23	1,980-72	2,020-52	2,113-56	1,850-29	2,702-82	2,184-50	2,177-33	2,087-26	1,941-50	24,921-71

Total.  
4,1911.

ons.

27-10  
175-65  
982-25  
081-86  
344-64  
250-54  
989-17  
912-35  
729-56  
362-78  
348-08  
392-52  
616-44  
707-57  
818-07  
238-40  
474-57  
146-61  
14-61  
748-08  
680-01  
651-42  
75-73  
780-87  
347-74  
034-85  
778-90  
9-87  
747-74  
422-50  
121-15  
228-43  
3-93  
45-71  
1,182-12  
28-30  
3-30  
558-64  
252-39  
1,856-58  
3,826-38  
88-45  
4,954-45  
231-51  
0-47  
36-00  
34-81  
24-15

r of the

The ore produced in the years 1908 to 1911, was shipped to the following countries for treatment:—

Country.	1908.		1909.		1910.		1911.	
	Tons.	Per cent	Tons.	Per cent	Tons.	Per cent	Tons.	Per cent
Canada .....	7,401.14	29.18	10,230.61	34.47	9,922.40	29.20	8,746.21	34.02
Great Britain .....	222.68	0.88	30.25	0.10	393.73	1.15	.....	.....
Germany .....	299.46	1.18	106.51	0.35	232.14	0.69	218.66	0.85
United States .....	17,439.42	68.76	19,575.59	65.08	23,428.70	68.96	16,745.35	65.13
Total .....	25,362.10	100.00	29,912.99	100.00	33,976.97	100.00	25,710.22	100.00

With respect to concentration Mr. Cole reports: "Fifteen mills operated during the year, milling a total of 381,870 tons. The Hudson Bay mill started operations in March but the Silver Cliff, King Edward, and Cobalt Central mills were closed down most of the year. The King Edward mill has recently been rented by the City of Cobalt Mining Company for the treatment of their own ores.

"Mills are under construction for the Beaver and Nipissing Companies. Cyanidation is used in conjunction with regular water concentration in the O'Brien and Buffalo mills and in the case of the Nova Scotia it is a combination method of cyanidation and amalgamation. The latter combination is also to be adopted in the new Nipissing mill.

"The following is a list of the mills of the district showing their daily rated capacity:—

Mill.	District.	Capacity per day.	Remarks.
		Tons.	
Buffalo .....	Cobalt .....	150	Closed down.
Cobalt Central .....	" .....	100	
Cobalt Lake .....	" .....	70	
Colonial .....	" .....	30	
Comogas .....	" .....	160	
Hudson Bay .....	" .....	50	
King Edward .....	" .....	30	Operated by City of Cobalt mine.
McKinley-Darragh .....	" .....	120	Customs Mill.
Nipissing Reduction .....	" .....	75	
Northern Customs .....	" .....	200	" "
Nova Scotia .....	" .....	160	" "
O'Brien .....	" .....	90	Closed down.
Silver Cliff .....	" .....	80	
Timiskaming .....	" .....	80	
Trethewey .....	" .....	100	Closed down.
Millerett .....	Gowganda .....	30	
Reeve Dobie .....	" .....	30	
<i>Under Construction.</i>		1,555	
Beaver .....	Cobalt .....	60	
Nipissing .....	" .....	200	
		1,815	

"Following are tables of concentration which illustrate the advance made in this part of the industry during 1911.

Mills and mines.	Tons milled.	CONCENTRATES.			Concentration ratio.
		Digs.	Tables.	Total.	
Buffalo*	43,930 00	236 00	735 00	971 00	45-1
Cobalt Central.....	1,478 40	3 82	12 37	16 19	91-1
Colonial.....	7,755 00			127 00	61-1
Cobalt Lake.....	3,800 00	39 15	55 15	94 30	40-1
Coniagas.....	53,150 00	318 70	952 40	1,271 10	42-1
Hudson Bay.....	18,294 00	239 00	427 00	666 00	27-1
King Edward—					
City of Cobalt.....	1,947 50	3 00	25 00	28 00	38-1
King Edward.....	12,919 00			16 50	73-1
McKinley-Darragh.....	46,497 00	644 00	1,884 00	2,528 00	18-1
Millerett.....	5,454 00	8 00	82 00	90 00	61-1
Nipissing Reduction.....	14,766 53	87 82	150 73	238 55	62-1
Northern Customs—					
City of Cobalt.....	5,911 08			233 07	25-1
Cobalt Townsite.....	12,569 97		388 39	388 39	33-1
Casey Cobalt.....	362 00			12 00	33-1
La Rose.....	36,264 49		1,721 10	1,721 10	21-1
Nancy Helen.....	519 00		4 80	4 80	108-1
Timiskaming.....	34,720 00	177 44	588 23	765 67	45-1
Trethewey.....	30,925 00	107 68	341 12	448 80	69-1
<b>Total</b> .....	<b>329,162 97</b>			<b>9,620 47</b>	<b>34-1</b>

\* The mill cyanided 8,801 tons slimes producing 4,565 lbs. of bullion.

Nova Scotia..... 19,152 tons milled, produced 686,406 ozs. bullion.

O'Brien..... 33,256 " " 273,930 "

52,408 960,336

Total tons milled by water concentrating mills..... 329,462 97

" " cyanide mills..... 52,408 00

Total tons milled..... 381,870 97

"From small beginnings and a comparatively insignificant position in the early history of Cobalt, concentration has developed till it is at present one of the dominating features of the situation. In fact, it is hardly too much to say that half the mines now shipping would be closed down if they had to depend on their high grade ore without their mills for their profits."

### Sampling.

"The ore sampling works of Campbell and Deyell were in continuous operation throughout 1911 and during that time treated 5,653 tons of high grade ore. This represents about 70% of the capacity of the plant. The plant was designed to sample the high grade silver ores of the Cobalt district and details have been worked out with the greatest care. Machines are being installed which cut out the objectionable feature of floor sampling so that now the plant is practically automatic throughout. The work performed in this plant is equal to the best on the continent and having it located in Cobalt is a decided boon to the camp."

### Power.

"The spring break up of 1911 was late in arriving and was not preceded by any considerable temporary thaws.

"So pronounced was the shortage of water that the production of power was materially affected.

"This noticeably cut down the volume of ore shipment during the first three months of the year.

"Towards the end of the year a consolidation took place of the two Montreal River Power Companies, viz.: The Cobalt Power Company and The Cobalt Hydraulic Power Company, under the name of the Northern Ontario Light and Power Company, Limited."

### Smelting of Cobalt Ores.

"The following is a list of the smelting companies that received ore from the Cobalt district during 1911 accompanied by some of the schedules on which the purchases were made. As far as possible the tariffs given are those that were in force on January 1, 1912.

"The following is the list:—

Canadian Copper Company, Copper Cliff, Ont.

Canada Refining and Smelting Company, Orillia, Ont.

Coniagas Reduction Company, St. Catharines, Ont.

Deloro Mining and Reduction Company, Deloro, Ont.

American Smelting and Refining Company, New York, N.Y., U.S.A.

Balbach Smelting and Refining Company, Newark, N.J., U.S.A.

Beer, Soudheimer and Company, Frankfort-on-Main, Germany, and  
New York, N.Y., U.S.A.

Pennsylvania Smelting Company, Pittsburg, Pa., U.S.A.

Government of Saxony, Saxony, Germany.

United States Metals Refining Company, New York, N.Y., U.S.A.

#### 1. Canadian Copper Company, Copper Cliff, Ont.

"Recent changes have increased the capacity of the plant from 800 to 1,000 tons per month, giving a monthly output of silver of from 1,000,000 to 1,500,000 ounces. Another result of the enlargement and the changes that have been made is the quicker returns to shippers. Formerly the Company paid for 70 per cent of the silver in 35 days, and 30 per cent in 90 days from sampling date. Since December 1, 1910, payments are made 70 per cent in 30 days and 30 per cent in 60 days.

All purchases are made by the Orford Copper Company of New York, and the following is the curtailed schedule for arsenical-cobalt-silver ores.

Purchaser to make payment for:—

84 per cent of silver per ton of ore (2,000 lbs.) when same assays				200- 50 ounces silver.
85	"	"	"	500- 600 "
87	"	"	"	600- 800 "
90	"	"	"	800-1,000 "
92	"	"	"	1,000-1,300 "
93	"	"	"	1,300-1,600 "
93½	"	"	"	1,600-2,000 "
94½	"	"	"	2,000-2,500 "
95	"	"	"	2,500-3,000 "
95½	"	"	"	3,000-4,000 "
96	"	"	"	4,000-5,000 "
96½	"	"	"	5,000 and over "

Ore to be delivered to the Canadian Copper Company c.o.b. cars, Copper Cliff, Ont. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux and Company of New York, at seller's expense, which assays are to govern in settlement.

Payment of 70 per cent of the silver returnable to the seller, as per the above scale, to be made at the New York official price for silver on the first settlement date, which shall be 30 days after the date on which sampling of the ore is completed, and the balance, 30 per cent, on the second settlement date, on the New York official price of silver on that day, which shall be 60 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified, in lieu of cash, at his option, such silver bullion (commercial bar silver) as is due the seller in settlement upon these dates, such delivery to be made in New York city.

## 2. Coniagas Reduction Company, Limited, St. Catharines, Ont.

"The plant of the Coniagas Reduction Company treated about 6,000,000 ounces of silver during 1911, most of the resulting bullion being shipped to London, England.

The following is in condensed form the smelting schedule that went into effect on November 1, 1911.

Percentage of silver to be paid for on commercial assay of silver content per tons of 2,000 pounds as follows:—

55 per cent for	50 ounces and	proportionate increase up to.
73	200	"
75	300	"
84	300	"
91.5	1,000	"
92.5	1,500	"
93.5	2,000	"
95	3,000 ounces and over.	

Sampling to be at vendor's expense.

All ore purchased to be at a refining charge of  $\frac{3}{4}$  cent per ounce of silver content.

Seventy-five per cent of the amount 30 days after date of weighing and sampling report.

Twenty-five per cent of amount 90 days after date of said report. Price of silver to be determined by New York quotation, as given by Messrs. Handy and Harman to Western Union Telegraph-Company on dates of settlement.

*3. Deloro Mining and Reduction Company, Limited, Deloro, Ont.*

"The smelting schedule of this Company published at the beginning of 1911 was still in force on the 1st of January, 1912, and is as follows:—

Treatment charge, \$25 per ton of ore.

Refining charge, three-quarters of a cent per ounce of silver contents on ore assaying 3,000 ounces and over per ton. One cent per ounce of silver contents on ore assaying 2,000 to 3,000 ounces per ton. One and a half cents per ounce of silver contents on ore assaying less than 2,000 ounces per ton.

Terms of payment, 75 per cent of net proceeds at Handy and Harman's New York quotation, 30 days after completion of sampling; 25 per cent of net proceeds at Handy and Harman's New York quotation, 90 days after completion of sampling. Ore to be delivered in carload lots f.o.b., Marmora station, C. O. railway, and to be at shipper's risk until sampling is undertaken.

*4. Canada Refining and Smelting Co., Limited, Orillia, Ont.*

"This Company blew in its furnace on February 20, 1911, but was closed down later on while the plant was being enlarged. Its present capacity is from 15 to 20 cars monthly or double what it was when operations started.

The smelting schedule remains unchanged and is as follows:—

84	per cent of silver contents by commercial assay	200	ozs. and over per ton,	2,000	lbs.
86	"	"	"	300	"
89	"	"	"	500	"
91	"	"	"	750	"
93	"	"	"	1,000	"
93½	"	"	"	1,500	"
94½	"	"	"	2,000	"
95	"	"	"	2,500	"

Ores containing less than 3,000 ounces per ton are subject to a refining charge of  $\frac{1}{2}$  cent per ounce, and ores containing less than 1,500 ounces per ton are subject to a refining charge of  $\frac{3}{4}$  cent per ounce. Ores containing less than 1,000 ounces per ton are subject to a treatment charge of \$10 per ton in addition to above.

Terms of payment for silver, 75 per cent of amount 30 days after date of weighing and sampling report. 25 per cent of amount 90 days after date of said report.

Price of silver to be New York official quotation.

Ore to be delivered f.o.b., Orillia, carload lots at owner's risk.

Weights to be taken after milling and moisture determination.

When so desired, Campbell and Deyell's sampling and weights will be accepted as final, and in case of dispute on assays, settlement will be made on



assays of Campbell and Deyell as umpire, or such other umpire as may be mutually agreed upon by parties.

*5. American Smelting and Refining Company, New York, U.S.A.*

"Of the foreign companies receiving silver ores from Cobalt, the American Smelting and Refining Company received the largest tonnage. The ore was consigned to both Perth Amboy, N.J., and Denver, Colo., and consisted of both high and low grades.

The prices offered by this Company vary according to the grade and analysis of the different ores submitted and also as to whether or not occasional shipments are involved or time contracts for entire outputs. Prices are also contingent to some extent upon length of contract and upon operating conditions at the smelter at the time any definite tonnage is offered. An idea of the prices ruling may, however, be gathered from the following contract rates which are now in effect:—

Tariff.—For ores assaying 1,000 ounces or over per ton.

Silver.—Pay for 95 per cent of the silver contents at New York quotation.

Treatment Charge.—\$7 per ton of 2,000 pounds, dry weight.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent of arsenic in excess of five per cent. Sampling free.

Payment.—Thirty days after agreement of assays.

For ores under 1,000 ounces and over 60 ounces per ton.

Silver.—Payment for 95 per cent of the silver contents at the New York quotation.

Treatment Charge.—\$7 per ton of 2,000 pounds, dry weight.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton for each per cent of arsenic in excess of 15 per cent.

Payment.—Cash settlement on agreement of assays.

*6. Balbach Smelting and Refining Company, Newark, N.J., U.S.A.*

This smelting company has not been offering a regular schedule for silver ores from the Cobalt district. It did, however, make some purchases during the year, returning 93 per cent of the silver contents in ores assaying about 2,000 ounces silver per ton.

*7. Beer, Sondheimer and Company, Frankfort-on-Main, Germany.*

"At the beginning of 1911, a few purchases of silver ores from Cobalt were made by the New York agency of Beer, Sondheimer and Company, but now the Company is out of the market for these ores.

*8. Pennsylvania Smelting Company, Pittsburgh, Pa., U.S.A.*

"The smelting schedule of the Pennsylvania Smelting Company, on the 1st of January, 1912, was the same as that which ruled throughout 1911, except that

on ores running over 2,800 ounces of silver per ton a sliding scale is offered which gives a better percentage recovery to the shipper in proportion as the ore increases in silver contents. It is now as follows:—

Schedule for ores below 2,800 ounces.

For ores containing less than 200 ounces of silver to the ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

For ores containing 200 to 400 ounces silver per ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

For ore containing 400 to 2,000 ounces silver to the ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less a treatment charge of \$8 per ton.

For ores and coarse concentrates containing 2,000 ounces and upwards of silver per ton, we will pay the full New York silver price, for 95 per cent of the silver contents, no treatment charge.

For Vanner or Wilfley products, we will pay the New York silver price, less one cent per ounce for 94 per cent of the silver contents, less \$8 per ton treatment charge.

For jig concentrates containing from 400 to 2,000 ounces silver per ton, we will pay the New York silver price, less  $\frac{1}{2}$  cent per ounce for 95 per cent of the silver contents, less treatment charge of \$8 per ton.

Low grade 'ores' are expected to run less than 10 per cent arsenic.

All the above f.o.b. cars our works, Carnegie, Pa., P.C.C. and St. Louis railway.

Schedule for ores above 2,800 ounces:—

No treatment or refining charge.

For ores between 2,800 and 3,000 ounces, 95½ per cent of the silver contents is paid for, and increase in the percentage of silver paid for by  $\frac{1}{3}$  of 1 per cent for every 200 ounces up to 4,800 ounces per ton. For ores assaying over 4,800 ounces the percentage of silver paid for is constant at 96½ per cent. All other conditions are the same as for ores below 2,800 ounces.

Settlement assays to be the average of our results and shippers or shippers' representatives, if within splitting limits, otherwise reserve sample to be sent to umpire.

Splitting limits on ores of less than 150 ounces per ton to be 1½ ounces, on ores of 150 ounces and less than 500 ounces, 1 per cent of contents, on ores of more than 500 ounces 8-10ths of 1 per cent of contents.

#### 9. Government Smelter, Saxony.

The Government Smelter of Saxony has been receiving some high grade ore from Cobalt on the following contract basis:—

Pay for 96 per cent silver contents on Hamburg quotation of silver.

Payment, 30 days after arrival in Hamburg.

Ore must assay at least 4,500 ounces silver per ton.

Above contract is made on a minimum of six cars.

10. *United States Metals Refining Company, New York—Works at Chrome, N.J., U.S.A.*

"The silver ores from Cobalt that are being purchased by this Company are comparatively low grade, the richest containing 400 ounces silver per ton. No regular schedule is published, but the prices vary with the character of the ore purchased."

A number of the shipping companies at Cobalt have published, in annual reports, some details of their operations, from which the following extracts have been taken:—

**Coniagas Mines, Limited, Year Ending October 31, 1911.**

TOTALS OF SHIPMENTS FROM THE MINE.

Year.	Ore.		Concentrates.		Total.	
	Tons.	Ozs.	Tons.	Ozs.	Tons.	Ozs.
Nov. 1st-Oct. 31st.						
1905-1906	289	657,513			289	657,513
1906-1907	2,655	1,341,372			2,655	1,341,372
1907-1908					627 5	1,457,210
1908-1909	350	807,253	426	599,975	776	1,407,228
1909-1910	330 1	979,630	645 5	949,901	975 6	1,929,531
1910-1911	619 1	2,142,536	1,418 4	1,643,516	2,037 5	3,789,274
Total to Oct. 31, 1911.	4,243 2	5,928,304	2,489 9	3,193,492	7,360 5	10,582,128

\* Ore and concentrates.

A canvas table plant has been installed and operating since January 1, which enables us to recover a low grade concentrate which was previously going to waste.

The total amount milled during the year was 52,320 tons, averaging 36.3 ounces per ton. The average value of tailings from the mill was 4.75 ounces per ton.

**Crown Reserve Mining Company, Limited, Year Ending December 31, 1911.**

**SHIPMENTS.—TOTAL PRODUCTION.**

Shipments.	Weight.		Silver.		Gross value.	Treatment.	Net value.
	Tons.	Ozs.	\$ cts.		\$ cts.	\$ cts.	
High grade.....	644 561	2,991,404	1,695,568 90		71,937 34	1,533,631 56	
Low grade.....	390 256	64,284	33,862 33		8,319 62	25,542 71	
Bullion.....	7 952	221,792	114,037 38		1,371 37	112,666 01	
Milled ore (shipped as bullion).....	1,042 769	3,277,480	1,753,468 64		81,628 33	1,671,840 28	
	5 820	153,422	80,048 19		588 26	79,459 93	
Total shipments.....	1,048 589	3,430,902	1,833,516 80		82,216 59	1,751,300 21	

**TOTAL SHIPMENTS TO DATE.**

Year.	Dry wt. Tons.	Gross oz.	Gross value.		Net value.	Cost per oz.
			\$ cts.	\$ cts.	\$ cts.	Cts.
1908.....	650 78	1,798,954	910,350 62		851,788 89	7 508
1909.....	3,093 00	4,034,325	2,080,156 08		1,895,481 92	10 31
1910.....	2,753 00	3,218,196	1,757,824 27		1,633,716 65	14 97
1911.....	1,048 59	3,430,902	1,833,516 80		1,751,300 21	10 674
Total.....	7,515 37	12,512,377	6,584,847 77		6,136,290 68	

Mine development to end of 1911:—

Sinking and raising.....	1,790 feet.
Difting.....	5,247 "
Cross-cutting.....	5,172 "
Total.....	12,209 "

**Kerr Lake Mining Company, Year Ending August 31, 1911.**

"The total development to August 31, 1911, is 21,946 feet, equal to a little over four miles.

"The costs of production per ounce are as follows:—

Mining and development costs.....	9.71 cents.
Shipment and treatment charges.....	4.59 "
Administration and general.....	0.39 "
Total.....	14.69 "

"The cost has been somewhat increased by reason of a larger proportion of development work compared with stoping during the year."

**The La Rose Consolidated Mines Company, Year Ending December 31, 1911.**

**TOTAL SHIPMENTS TO DECEMBER 31, 1911.**

	Dry tons.	Ounces silver.	Gross value. Silver by-pro- duct paid for.	Net value re- ceived from smelter.
			\$ cts.	\$ cts.
Previous to May 31, 1908.....	5,583 0000	2,575,161 00	1,711,422 00	1,504,707 00
May 31, '08, to May 31, '09.....	5,063 6705	2,915,706 58	1,516,881 55	1,320,698 25
May 31, '09, to May 31, '10.....	6,313 9050	3,100,443 93	1,652,416 76	1,442,192 98
May 31, '10, to Dec. 31, '10.....	2,380 1085	2,118,571 25	1,147,276 36	1,040,333 98
During year 1911.....	5,561 4120	4,092,709 33	2,191,524 34	2,014,391 49
<b>Total.....</b>	<b>23,902 5060</b>	<b>14,902,595 09</b>	<b>8,219,521 01</b>	<b>7,322,923 70</b>

Development work done during 1911, 11,045 feet shafts, drifts, cross-cuts, and raises, stoping 13,589 cubic yards, trenches 15,095 feet.

**SUMMARY OF SHIPMENTS.**

Dry tons shipped.....	3,561 412
Gross ounces of silver contained.....	4,092,709 33
Gross silver value.....	\$2,191,524 34
Average price received per ounce—cents.....	53 55
Smelter deduction freight and treatment.....	177,132 85
Net value received from ore sales.....	\$2,014,391 49

**Nipissing Mines Company, Year Ending December 31, 1911.**

**TOTAL SHIPMENTS TO DECEMBER 31, 1911.**

Year.	Dry weight.	Gross silver.	Gross value silver, plus by products paid for.	Net value returned from smelter.
	Lbs.	Ozs.	\$ cts.	\$ cts.
4.....	124,659	32 13	24,163 90	23,887 52
1 05.....	929,373	753,153 90	505,638 28	471,666 61
1906.....	4,019,494	2,214,821 60	1,576,852 04	1,121,655 54
1907.....	4,804,426	2,230,551 89	1,373,088 57	1,234,492 35
1908.....	7,009,398	2,893,031 14	1,526,686 32	1,364,478 03
1909.....	12,825,169	4,646,869 21	2,417,767 21	2,180,407 02
1910.....	13,397,860	5,597,778 61	3,008,000 98	2,742,321 23
1911.....	5,829,254	4,678,071 14	2,567,196 98	2,381,712 54
<b>Total.....</b>	<b>48,950,233</b>	<b>23,023,312 92</b>	<b>12,939,395 18</b>	<b>11,820,620 84</b>

The mill for the treatment of first class ore was started February 1, 1911, and is now successfully treating the entire product of the mine.

The process, which is a new one as far as its application to Cobalt ores is concerned, was devised by Charles Butters and his assistant, G. H. Clevenger;

James Johnston erected the plant and has had charge of it since. The process consists essentially of amalgamation in cyanide solution in a tube mill where more than 97 per cent of the silver in the ore is recovered as amalgam. The residue then undergoes regular cyanide treatment whereby an additional extraction is made. During the summer a refinery was erected, since which time the whole product of the mill has been shipped as fine bullion.

Trenching was confined to the section south and east of Peterson lake.

A force of 25 men completed 13.7 miles of trenches 2.7 feet deep at a cost of \$8,831.58.

Summary of underground work in 1911:—

Drifting, 3,675 feet; cross-cutting, 3,602; raising, 1,208; sinking, 296; total, 8,781 feet. Stopping, 13,841 cubic yards.

### McKinley-Darragh Mines of Cobalt, Ltd., Calendar Year, 1911.

“Extent of mining operations:—

McKinley-Darragh to January 1, 1912, 20,066 feet drifts, cross-cuts, raises, winzes, and shafts; Savage, to January 1, 5,955 feet.

“Mill report:—

Total ore treated, 1911, 46,497 tons.

Number stamp days run, 318.66.

Average tons per day, 145.91.

Mill heads, 39.685.

Mill tails, 4.122.

Per cent of extraction, 89.614.

Ounces of silver recovered, 1,653,595.”

### Timiskaming Mining Company, Limited, Calendar Year, 1911.

#### SUMMARY OF PROGRESS.

Class of work.	Year 1911.	Since commencement of operations.
Shaft sinking .....	112.0	958.0
Winzes and raises .....	353.8	1,100.8
Drifting .....	2,184.2	8,549.2
Cross-cutting .....	936.0	2,202.0
	3,586.0	12,810.0

Total depth of No. 2 shaft from collar equals 628.0 feet.

## PROSPECTING, DEVELOPMENT, AND MINING COST PER TON.

24,783 tons ore elevated.

40,937 tons ore and waste elevated.

	Cost per ton, ore.	Cost per ton, ore and waste
	\$ cts.	\$ cts.
Prospecting.....	1 32	0 80
Development.....	1 67	1 01
Mining and timbering.....	2 98	1 80
Hoisting.....	0 88	0 51
Cost to surface.....	6 85	1 15

" No payment was made this year on any of the by-products, cobalt, nickel, or arsenic. On the other hand we were penalized on an excess arsenic content by some of the smelters.

" The 34,720 tons treated in the mill produced 770 tons of shipping product which gives a ratio of concentration of about 45 into 1.

" The stamp duty was about 3.13 tons per 24 hours which is somewhat better than that of last year.

" The milling cost per ton covering all charges..... was \$3.00 per ton as compared with \$3.86 of last year, an improvement of 86 cents per ton."

**British Columbia.**

The chief sources of the silver production in this Province are the silver-lead ores of East and West Kootenay, supplemented by the silver contained in the gold-copper-silver ores of Rossland, Boundary, and Coast districts. The production in 1911, based on smelter recoveries, was 1,887,147 ounces, valued at \$1,005,924.

The leading silver producers among the mines of the Province in order of importance are the Van Roi, Sullivan, Rambler-Cariboo, St. Eugene, Ruth, and Standard.

The Granby mines at Phoenix on account of their large tonnage of copper ores come fourth as silver producers, with the others maintaining their relative positions.

Considerable attention is being paid to the silver-lead properties of the Slooan district, with probabilities of increased production, from the Sandon, Silverton, and Ainsworth camps. The following table is taken from the annual report of the Minister of Mines for British Columbia, 1911:—

## SILVER.—TABLE 3.

## Production in British Columbia by Districts, 1907-1911.\*

	1907.	1908.	1909.	1910.	1911.
	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.
Cassiar.....	2,291	11,169	4,569	1,454	29,976
Kootenay East					
Fort Steele division.....	821,367	641,855	580,240	501,475	330,235
Other divisions.....	3,935	3,384	825	243	
Kootenay West—					
Ainsworth division.....	301,322	314,142	352,555	233,010	77,375
Nelson.....	236,837	25,067	75,908	45,787	76,774
Slocan.....	590,998	848,595	738,175	964,634	793,926
Trail Creek.....	126,661	129,558	80,026	87,833	88,076
Other divisions.....	122,232	173,675	169,435	107,733	67,884
Yale—					
Boundary.....	469,206	451,323	492,333	460,945	326,849
Yale.....	223	23		3	343
Coast and other districts.....	70,356	29,598	38,676	47,104	100,926
Total.....	2,745,448	2,631,389	2,532,742	2,450,241	1,892,364

\* From the Minister of Mines Reports, British Columbia.

## Yukon.

The figures of silver production of the Yukon, given in Table 2, 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. In 1909, the production was 45,000 ounces of silver, all from the placer mines. In 1910, the placer production was 50,000 ounces, valued at \$26,743, and the lode production 37,418 ounces, valued at \$20,013, or a total of 87,418 fine ounces valued at \$46,756. In 1911 the placer production was 50,300 ounces, valued at \$26,812, and the lode production 62,408 ounces, valued at \$33,266, a total of 112,708 fine ounces with a value of \$60,078.

## 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 1911 were 31,216,725 ounces, valued at \$15,807,366, as against exports of 30,699,270 ounces, valued at \$15,649,537, in 1910.



## SILVER.—TABLE 4.

## Exports of Silver in Ore, etc.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1886	25,957	1895	994,354	1904	1,904,394
1887	206,284	1896	2,771,959	1905	2,777,218
1888	219,008	1897	3,576,391	1906	5,686,444
1889	212,163	1898	2,902,277	1907	9,941,849
1890	204,142	1899	1,623,905	1908	12,493,482
1891	225,312	1900	2,341,872	1909	15,719,909
1892	56,688	1901	2,026,727	1910	15,649,537
1893	213,695	1902	1,829,058	1911	15,807,366
1894	359,731	1903	1,989,474		

## ZINC.

The production of zinc ore in Canada in 1911, as obtained by direct returns from the producers, was 2,590 tons valued at \$101,072, the greater part being from British Columbia. The zinc content of these shipments was returned as 2,346,849 pounds, which if valued at the average New York price of spelter during the year would be worth \$135,132.

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 pay to ship. The Richardson, or Long Lake mine, in Olden township, Frontenac county, Ontario, did not ship during 1911.

The British Columbia shipments were seriously reduced as a result of the destruction of mills, mine buildings, and railway facilities by the forest fires of 1910, there being only two shippers in 1911.

The British Columbia zinc ore is exported for treatment to Kansas and Oklahoma smelters, and since the smelters demand over 80 per cent zinc, the maximum rate of the United States customs tariff affects Canadian ores.

The present schedule of the tariff on zinc is as follows:—

Ores containing less than 10 per cent, free of duty.

Ores containing 10 per cent or more, and less than 20 per cent,  $\frac{1}{4}$  cent per pound.

Ores containing 20 per cent or more, and less than 25 per cent,  $\frac{1}{2}$  cent per pound.

Ores containing 25 per cent or more, 1 cent per pound.

All rates being based on the metallic contents of the zinc.

The United States smelters usually pay on a basis of 45 per cent zinc content. The base price varies with the price of spelter at St. Louis, and a stated amount is added or deducted for every unit of zinc in excess of or less than the base. The silver is settled for at the New York price after making deductions for losses in treatment. Limits are frequently set which lead or iron contents may not exceed.

A typical example may be given. A certain mine was paid \$28.50 per short ton for zinc concentrates carrying 45 per cent zinc, when spelter was quoted at 5 cents per pound at St. Louis. For every unit above or below 45 per cent zinc 85 cents was added or deducted. For every increase or decrease of one cent per pound in the price of spelter at St. Louis, an increase or decrease was allowed of \$7 per ton of 2,000 pounds, and proportionately for fractions thereof. In the case of the silver content, six ounces per ton were deducted and 75 per cent of the remainder paid for at the New York price.

The sellers paid freight, customs duty, and collection charges.

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 until about 1899, in which year the imports were 1,213 tons. In the fiscal year ending March, 1909, they had risen to 4,610 tons, and for the calendar year, 1910, they totalled 7,037 tons, in addition to which there were 4,248 tons of zinc white, and zinc manufactures, to the value of \$21,829.

For the calendar year 1911, the total imports were 7,534 tons, in addition to which there were 4,269 tons of zinc white, and zinc manufactures to the value of \$30,862.

Statistics of the production and imports of zinc and the average monthly prices of spelter on the New York and London markets for two years are given in the accompanying tables:—

ZINC.—TABLE 1.  
Annual Production of Zinc.

Calendar Year.	ZINC ORE SHIPPED.		METALLIC ZINC IN ORE SHIPPED.	
	Tons.	Spot value.	Lbs.	Final value.
1888.....		\$		\$
1889.....	1,162	11,000	788,000	36,011
1900.....	865	18,165	814,000	46,805
1901.....	261	4,810	212,000	9,342
1902.....				
1903.....	158	1,659	142,200	6,882
1904.....	1,000	10,500	900,000	48,660
1905.....	597	3,700	477,568	24,256
1906.....	9,413	130,200	*	*
1907.....	1,154	23,800	*	*
1908.....	1,553	49,100	*	*
1908 (a).....	452	3,215	*	*
1910.....	18,371	242,699	16,468,204	906,245
1910.....	5,065	120,003	4,361,712	240,766
1911.....	2,590	101,072	2,346,816	135,132

\* Figures not available.

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

ZINC.—TABLE 2.  
Imports of Zinc in Blocks, Pigs, and Sheets.

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880	13,865	67,881	1891	17,984	105,023	1902	31,871	141,569
1881	20,920	91,015	1892	21,881	127,302	1903	26,646	112,827
1882	15,021	76,631	1893	26,416	121,360	1904	25,553	138,057
1883	22,705	94,799	1894	20,774	90,680	1905	25,111	141,514
1884	18,945	77,373	1895	15,061	63,373	1906	21,162	158,438
1885	20,954	79,598	1896	20,223	89,781	1907 (9 mos.)	18,427	126,221
1886	23,136	85,599	1897	11,916	57,754	1908	30,362	191,081
1887	26,142	98,557	1898	35,148	112,785	1909	26,222	141,066
1888	16,197	65,827	1899	18,785	107,477	1910	35,040	201,777
1889	19,782	83,935	1900	28,748	156,167	1911	31,659	206,716
1890	18,236	92,530	1901	20,527	103,457			

ZINC.—TABLE 3.  
Imports of Spelter.\*

Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.	Fiscal Year.	Cwt.	Value.
		\$			\$			\$
1880	1,073	5,301	1891	6,249	31,459	1902	18,356	80,757
1881	2,904	12,276	1892	13,909	62,550	1903	23,159	110,817
1882	1,654	7,779	1893	10,721	49,822	1904	33,952	164,751
1883	1,274	6,196	1894	8,423	35,615	1905	37,941	206,244
1884	2,239	10,417	1895	9,249	30,215	1906	50,137	290,686
1885	3,325	10,875	1896	10,897	40,548	1907 (9 mos.)	42,465	269,044
1886	5,432	18,238	1897	8,312	32,826	1908	65,593	314,369
1887	6,908	25,007	1898	2,794	13,561	1909	55,981	310,688
1888	7,772	29,762	1899	5,450	29,687	1910	132,001	658,285
1889	8,750	37,403	1900	5,836	29,416	1911	98,372	505,417
1890	14,570	71,122	1901	14,621	58,283			

\* Spelter in blocks and pigs.

## ZINC.—TABLE 4.

## 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	9,754
1882	15,526	1893	7,464	1904	12,682
1883	22,599	1894	6,193	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	10,563	1909	15,621
1888	7,402	1899	11,661	1910	15,195
1889	7,233	1900	11,475	1911	21,128
1890	6,472	1901	6,882		
1911	Zinc seamless drawn tubing manufactures of, N.O.P.		Duty free	\$	24,128
			25	\$	24,128
		Total		\$	24,128

## World's Production of Spelter in Short Tons.\*

Country.	1906.	1907.	1908.	1909.	1910.	1911.
Australia	1,131	1,098	1,198		560	1,120
Austria and Italy	11,883	12,522	14,063	13,931	14,666	15,350
Belgium	168,067	170,307	181,851	184,194	190,233	215,062
France and Spain	59,293	61,438	61,512	61,859	65,191	70,795
Germany—						
Rhine district	75,729	77,459	80,670	82,863	86,823	103,863
Silesia	150,282	152,611	158,328	159,731	154,596	172,161
Great Britain	57,971	61,286	60,029	65,422	69,531	73,808
Holland	16,150	16,526	19,017	21,548	23,121	25,060
Poland	10,595	10,735	9,710	8,758	9,514	10,640
United States	224,770	249,860	210,424	255,760	269,181	284,526
Total	775,871	813,842	796,832	851,066	883,419	974,385

\* Mineral Resources of the United States 1911.

## World's Consumption of Spelter in Short Tons.\*

Country.	1907.	1908.	1909.	1910.
Austria-Hungary	34,171	35,925	36,155	37,258
Belgium	60,627	74,936	68,343	86,531
France	76,720	85,956	73,744	61,949
Germany	192,792	198,580	207,232	196,209
Great Britain	151,653	152,627	171,408	195,989
Holland	4,189	4,188	4,409	4,409
Italy	7,496	9,257	9,039	8,929
Russia	19,290	19,946	20,282	27,447
Spain	5,180	5,290	4,850	4,740
United States	13,228	11,020	6,614	13,228
Other countries	226,969	214,167	270,730	245,684
Total	795,315	811,892	872,806	882,573

\* Mineral Resources of the United States, 1910.

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

Month.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.
January	4 13	4 27	4 865	4 863	6 190	6 487	6 732	4 513	5 141	6 101	5 452
February	4 01	4 15	5 043	4 910	6 139	6 075	6 814	4 785	4 889	5 569	5 518
March	3 91	4 28	5 349	5 057	6 067	6 200	6 837	4 665	4 757	5 637	5 563
April	3 98	4 37	5 550	5 219	5 817	6 087	6 687	4 645	4 665	5 439	5 399
May	4 04	4 47	5 639	5 031	5 434	5 097	6 441	4 608	5 124	5 191	5 348
June	3 99	4 06	5 697	4 794	5 190	6 096	6 410	4 543	5 402	5 128	5 529
July	3 45	5 27	5 662	4 873	5 396	6 006	6 072	4 485	5 402	5 152	5 695
August	3 99	5 44	5 725	4 866	5 796	6 027	5 701	4 792	5 729	5 279	5 933
September	4 08	5 49	5 686	5 046	5 887	6 216	5 236	4 706	5 796	5 514	5 869
October	4 23	5 38	5 510	5 181	6 087	6 222	5 436	4 801	6 199	5 628	6 102
November	4 29	5 18	5 038	5 513	6 145	6 375	4 925	5 059	6 381	5 976	6 390
December	4 31	4 78	4 731	5 872	6 522	6 563	4 254	5 137	6 249	5 924	6 301
Year	4 07	4 84	5 40	5 100	5 822	6 198	5 962	4 726	5 503	5 520	5 758

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

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

Month	1902.			1903.			1904.			1905.			1906.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	16	13	..	20	0	8	21	11	2	24	19	9	28	8	2
February	17	14	2	20	15	4	21	16	5	24	10	6	26	2	4
March	17	13	4	22	18	2	21	19	6	23	13	6	24	15	3
April	17	17	..	22	8	7	22	5	1	23	14	3	25	19	3
May	18	9	..	21	2	4	22	2	10	23	11	8	27	0	2
June	18	11	8	20	8	2	21	14	6	23	16	8	27	9	9
July	18	19	11	20	8	5	22	2	9	23	19	6	26	15	11
August	18	16	8	20	9	5	22	7	0	24	14	6	27	0	5
September	19	4	7	20	17	7	22	11	5	26	8	3	27	12	5
October	19	5	4	20	9	4	23	1	7	26	1	7	27	18	10
November	19	11	8	20	14	7	24	12	9	28	5	11	27	15	1
December	19	15	6	20	19	10	24	17	1	28	14	11	27	19	3
Year	18	0	11	20	19	5	22	11	10	25	7	7	27	1	5

Month	1907.			1908.			1909.			1910.			1911.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
January	27	7	1	20	6	3	21	6	3	23	4	2	23	17	9
February	26	1	5	21	0	7	21	8	9	23	3	1	23	5	6
March	26	4	8	21	1	5	21	8	8	23	0	7	23	0	4
April	25	17	5	21	6	1	21	10	1	22	9	10	23	14	10
May	25	14	2	20	2	10	21	19	..	22	1	14	24	7	6
June	24	10	2	19	2	2	21	19	11	22	3	2	24	12	3
July	21	18	11	18	14	1	21	18	9	22	5	5	25	0	1
August	22	1	7	19	6	9	22	0	3	22	14	0	26	6	9
September	21	0	11	19	10	2	22	17	1	23	2	7	27	15	6
October	21	12	11	19	15	1	22	3	4	23	16	6	27	5	1
November	21	8	4	20	17	1	23	2	1	24	1	9	26	15	1
December	20	3	3	20	19	2	23	1	3	24	0	5	26	17	0
Year	23	16	9	20	3	5	22	3	..	23	1	0	25	5	8

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

## MISCELLANEOUS METALLIC MINERALS.

### ALUMINIUM.

No commercial ores of aluminium have as yet been found in Canada. Aluminium is, however, made in extensive works at Shawenogan Falls, Que., 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, which probably includes bauxite, and exports of aluminium, are, however, published in the reports of the Department of Customs.

During the twelve months ending December 31, 1911, the imports of alumina were 18,607,200 pounds, or 9,304 tons, while the exports of aluminium in ingots, bars, etc., during the same period, were 4,990,100 pounds, or 2,495 tons, besides manufactures of aluminium, valued at \$1,555. The imported alumina was valued at 2.00 cents per pound, and the exported aluminium at 14.98 cents.

The imports of alumina and exports of aluminium during the past eight 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
		\$	\$	\$	\$	\$
1905	5,360,800	138,765	2,535,386	508,213	1,588	
1906	8,975,400	239,136	4,321,486	839,113	2,244	
1907	12,705,300	268,502	5,478,203	1,101,353	1,499	
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	1,160,242	3,741	
1911	18,607,200	372,009	4,990,100	747,587	1,555	

*Prices.*—The price of aluminium (No. 1 ingots), in New York, during 1911, varied between the limits of 18½ and 22 cents per pound; during 1910, the price varied between 20 and 24 cents per pound, while practically the same prices ruled during 1909.

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 cents to 16 cents; in 1910, from 14 cents to 17½ cents, and in 1911 from 11 to 13½ cents.

## ANTIMONY.

A few pounds of refined antimony were produced at Trail, British Columbia, in 1911, but beyond that there was no production from Canada. The West Gore Antimony Company did not operate during the year.

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. In 1909, in addition to the shipment of 33 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.

In 1908, customs returns showed an export of 118 tons of antimony ore valued at \$5,443.

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

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

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

### Annual Shipments of Antimony Ore.\*

Calendar Year.	Tons.	Value.	Calendar Year.	Tons.	Value.
		\$			\$
1886.....	665	31,420	1899 to 1904 ...	Nil.	Nil.
1887.....	584	10,860	1905 (a) .....	527	.....
1888.....	345	3,696	1906 (a) .....	782	.....
1889.....	55	1,100	1907.....	2,016	65,000
1890.....	26½	625	1908 (b) .....	118	5,443
1891.....	10	60	1909.....	35	1,575
1892 to 1897.....	Nil.	Nil.	1910.....	364	13,906
1898.....	1,314	29,000	1911.....	.....	.....

(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.



## Export of Antimony Ore.

Calendar Year	Tons.	Value	Calendar Year	Tons.	Value
1880	49	1,548	1895	67	180
1881	34	3,308	1900	210	3,441
1882	323	11,673	1901	10	1,643
1883	165	4,200	1902	30	13,658
1884	143	17,875	1903	33	4,332
1885	77	36,250	1904	160	7,237
1886	665	31,490	1905	325	27,118
1887	220	9,729	1906	420	17,634
1888	352	6,894	1907	1,327	37,897
1889	30	635	1908	148	5,493
1890	38	1,000	1909	4	126
1891	31	60	1910	239	14,095
1892 to 1897	Nil	Nil	1911	57	1,946
1898	1	14,295			

## Imports of Antimony.

Fiscal Year.	Lbs.	Value	Fiscal Year.	Lbs.	Value
1880		8	1896	133,200	9,557
1881	42,217	2,993	1897	134,661	8,031
1882		7,000	1898	156,151	12,350
1883	183,397	15,041	1899	289,066	16,851
1884	195,346	10,355	1900	186,997	20,001
1885	145,609	15,764	1901	350,737	24,711
1886	82,012	8,182	1902	504,822	30,276
1887	89,787	6,351	1903	868,116	65,434
1888	87,827	7,122	1904	418,943	27,112
1889	120,125	12,212	1905	186,154	12,828
1890	119,031	11,296	1906	403,918	56,297
1891	117,096	17,439	1907 (9 mos.)	321,385	71,193
1892	114,981	17,481	1908	481,899	66,484
1893	180,308	17,680	1909	444,254	32,133
1894	181,823	11,771	1910	563,662	40,681
1895	139,571	12,249	1911	610,208	42,234
	79,707	6,131			
					8
1911	{ Antimony, or regulus of, not ground, pulverized or otherwise manufactured ..... Duty { Antimony salts ..... "			567,987	35,796
				73,121	6,438
	Total			610,208	42,234

## COBALT.

Cobalt is an important constituent of the silver-cobalt-nickel-arsenides of Coleman and adjacent townships, more familiarly known as the Cobalt district, Province of Ontario, and these ores are now said to be the principal source of the world's consumption of cobalt.

With respect to the greater part of the ore shipped in which silver is the chief constituent of value, the purchasing smelters make no allowance for the cobalt content, and the mine owners, therefore, receive nothing for the cobalt.

The recovery of cobalt in Canada so far has been confined to the production of cobalt oxide and mixed cobalt and nickel oxides, by the Coniagas Reduction Company and the Deloro Mining and Reduction Company. During 1911, according to direct returns, there were produced 154,174 pounds of cobalt and nickel oxides and 1,260,832 pounds of cobalt material and mixed oxides of cobalt and nickel, the total value of all these products being \$221,690.

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

It is also estimated that the total ore shipments from Cobalt during the past eight years have contained upwards of 5,901 tons of metallic cobalt.

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.....	158	16	10 1	19,960
1905.....	2,144	118	5 5	100,000
1906.....	5,335	321	6 0	80,704
1907.....	14,788	730	5 0	104,426
1908.....	25,624	1,224	4 7	111,118
1909.....	30,677	1,533	5 0	94,965
1910.....	34,282	1,698	5 2	54,699
1911.....	26,653	852	3 2	170,890

The production of cobalt has so largely exceeded the demand as to cause a very great fall in the price.

The price of cobalt oxide (78.6 per cent Co) in New York, during 1907, remained uniformly at \$2.50 per pound. In 1908, the price fell to \$1.45 in April, and \$1.40 in November. During the first three months of 1909, from \$1.45 to \$2.60 was quoted, after which the price again fell, quotations ranging from \$1.10 to \$1.75 until December. In the latter part of December there was a further falling off to prices ranging from 80 to 85 cents per pound.

During 1910 the price remained fairly constant at from 80 to 85 cents per pound, while in December, 1911, it fell to from 75 to 80 cents per pound.

In the "Statistique de l'Industrie Minérale en France et en Algérie" for 1910, the following statement is of interest: "The production of cobalt ores which was more than 2,360 metric tons in 1908 and which fell to 548 tons in 1909, was only 51 tons in 1910 with a value of 4,860 francs or an average of 90 francs per ton.

"Thus New Caledonia, which for a long time enjoyed a veritable monopoly of the cobalt ore market, was suddenly supplanted in these markets by Canada as a result of the exploitation of the argentiferous-cobalt ores of the Cobalt district."

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 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".

## 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. These veins are in a zone of decomposed volcanic rock of Tertiary age.

During 1911 some development work was done by the Mercury Mines, Ltd., at Sechart, Vancouver island. Some ore was taken out but was piled on the dump for future treatment.

### Production of Mercury.

Calendar Year.	Flasks, 702 lbs.)	Price per flask.	Value.
		\$ cts.	\$
1895 . . . . .	71	33 00	2,343
1896 . . . . .	58	33 44	1,946
1897 . . . . .	9	35 00	324

### Imports of Mercury.

Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.	Fiscal Year.	Lbs.	Value.
		\$			\$			\$
1882 . . . . .	2,443	965	1892 . . . . .	30,936	15,038	1902 . . . . .	97,283	56,615
1883 . . . . .	7,419	2,991	1893 . . . . .	50,711	22,998	1903 . . . . .	164,968	91,625
1884 . . . . .	5,848	2,441	1894 . . . . .	36,914	14,483	1904 . . . . .	151,167	80,658
1885 . . . . .	14,490	4,781	1895 . . . . .	63,732	25,703	1905 . . . . .	103,330	48,412
1886 . . . . .	13,316	7,142	1896 . . . . .	77,969	32,333	1906 . . . . .	150,394	69,505
1887 . . . . .	18,409	10,618	1897 . . . . .	76,058	33,534	1907 (5 mos.) . . . . .	98,368	45,662
1888 . . . . .	27,951	11,943	1898 . . . . .	59,759	36,425	1908 . . . . .	178,411	76,549
1889 . . . . .	22,931	11,814	1899 . . . . .	103,017	51,695	1909 . . . . .	92,220	46,217
1890 . . . . .	15,912	7,977	1900 . . . . .	85,342	51,987	1910 . . . . .	283,980	146,914
1891 . . . . .	29,775	20,223	1901 . . . . .	140,610	94,564	1911 Duty free . . . . .	128,980	74,956

## MOLYBDENUM.

Although there are numerous occurrences of molybdenite in Canada of more or less undetermined value, there has been very little production of the mineral.

In 1902, about 6,500 pounds of molybdenum, 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 5, concession XIV, Sheffield township, Addington county.

According to "The Mineral Industry," published in New York: "The market for molybdenum ores is very narrow. The price fluctuates widely, and is generally subject to special negotiations at each particular sale. American buyers require concentrates to contain 90 to 95 per cent molybdenite, for which they will pay \$400 to \$450 per ton. The principal purchasers in the U.S. are Electrometallurgical Co. of America, New York; Primos Chemical Company, Primos, Penn.; DeGolia & Atkins, San Francisco, Cal. In Germany, Friederich Krupp, of Essen, is a large user of molybdenum."

During the year a report on the molybdenum ores of Canada was issued by the Mines Branch.<sup>1</sup>

<sup>1</sup>No. 93, Report on the Molybdenum Ores of Canada, by T. L. Walker, Ph.D., Mines Branch, Dept. of Mines, Ottawa, 1911.

## PLATINUM AND PALLADIUM.

Although no production of platinum or palladium is reported for 1910, it seems probable that some recovery of platinum may have been made from placer mining on the Tulameen river, B.C.

In the former years the chief source of the platinum production in Canada was the placer gravels of British Columbia, principally in the Similkameen district.

The nickel-copper ores of the Sudbury district also carry small quantities of the metals of the platinum group, and from 1902 to 1906 considerable quantities of these metals were recovered from accumulated residues resulting from the treatment of the mattes from Sudbury. This recovery, however, has apparently ceased.

The Tulameen district of British Columbia was visited in 1910 by Mr. Charles Camsell of the Geological Survey, who reports that "A few Chinese miners were again placer mining on a part of the bed of the Tulameen river between the mouths of Engle and Champion creeks. This particular portion of the stream bed has been worked over a great many times since the first discovery of gold on it. Within the last twelve years it has been mined at least eight times, and the old cabins, gravel dumps, and abandoned machinery, show that it had already been worked over years before. Gold and platinum are obtained here in about equal proportions. The evidence suggests that the gold and platinum on the stream bed are replenished annually from some nearby source. What this source is, has not yet been determined. There are no prominent gravel deposits directly above this point, but it is significant that it lies immediately below a sheared and broken zone formed in the bed-rock, on the contact of pyroxenite with green schists. The method of working is to divert the water by wing dams to one side of the stream bed, and mine the other by sluicing. The amount of gold and platinum actually recovered was not ascertained, but it appears to have been satisfactory to the miners."

### Annual Production of Platinum.

Calendar Year.	Value.	Calendar Year.	Value.	Calendar Year.	Value.
	\$		\$		\$
1887.....	5,100	1894.....	950	1901.....	107
1888.....	6,000	1895.....	3,800	1902.....	46,502
1889.....	3,500	1896.....	750	1903.....	33,345
1890.....	4,500	1897.....	1,000	1904.....	10,872
1891.....	10,000	1898.....	1,500	1905.....	500
1892.....	3,500	1899.....	825	1906.....	*
1893.....	1,800	1900.....	Nil		

\* See under Palladium.

## Annual Production of Palladium.

	Ozs.	Value.
1902 Palladium.....	4,411	\$86,014
1903 ".....	3,177	61,952
1904 ".....	952	18,564
1905 Metals of the platinum group.....	1,562	28,116
1906 ".....	314	5,652
1907-1910 ".....	* Nil	Nil.

\*Ontario Bureau of Mines Report, 1910.

## 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.....	3,957	1905.....	61,719
1886.....	1,154	1896.....	6,185	1906.....	54,494
1887.....	1,422	1897.....	9,051	1907 (9 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		

\* 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.



## 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 recent 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 Report of the Geological Survey Branch, of the Department of Mines, for 1907, pages 77, and 80 to 83, and in the report for 1908, page 154.

In further reference to the New Ross occurrences, Mr. Faribault, in his summary report for 1910, states that: "At New Ross, Lunenburg county, some distance east of the district surveyed last summer, two important veins, one bearing manganese and the other tin and copper, were opened last summer.

"A tin-bearing vein, also recently discovered by Ernest Turner, at Mill Road, four miles north of New Ross, has been prospected under the management of A. L. McCallum. It has been proved to a depth of 20 feet, and for a length of 250 feet, while the float has been traced half a mile towards the north. The vein is 24 inches wide, mostly made up of quartz, merging with granite at the sides, and carries at the middle a streak of rich ore from three to five inches wide. Several assays of the ore made by Mr. McCallum have given from 10 to 30 per cent tin, and 8 per cent copper, present in the form of cassiterite and chalcopyrite, with association of tungsten-bearing zinc minerals."

The imports of tin and manufactures thereof into Canada are shown in the following table:—

## Imports of Tin and Tinware.

Fiscal Year.	Value.	Fiscal Year.	Value.	Fiscal Year.	Value.
	\$		\$		\$
1880.....	281,890	1891.....	1,206,918	1902.....	2,293,958
1881.....	413,924	1892.....	1,594,205	1903.....	2,712,186
1882.....	790,285	1893.....	1,242,994	1904.....	2,389,557
1883.....	1,274,150	1894.....	1,310,389	1905.....	2,791,757
1884.....	1,018,493	1895.....	973,397	1906.....	3,336,948
1885.....	1,060,883	1896.....	1,237,684	1907 (9 mos.).....	2,719,813
1886.....	1,117,368	1897.....	1,274,108	1908.....	4,059,281
1887.....	1,187,312	1898.....	1,550,851	1909.....	2,985,961
1888.....	1,164,273	1899.....	1,372,813	1910.....	3,822,443
1889.....	1,243,794	1900.....	2,418,455	1911.....	4,647,784
1890.....	1,289,756	1901.....	2,339,109		

	Duty	Lbs.	\$
Tin crystals.....	Free.		4,933
Tin in blocks, pig, and bars.....	"	3,570,600	1,242,436
Tin plates and sheets.....	"	88,050,400	2,859,611
1911 } Tin foil.....	"	1,013,763	133,758
} Tinware, plain, japanned or lithographed, and all } manufactures of tin, N. E. S. . . . .	25%		407,003
} Tin strip waste.....	Free.	8,000	48
Total.....			4,647,784

## TUNGSTEN.

Reference was made in the report for 1908 to the discovery of scheelite in Halifax county, Nova Scotia. 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 228-234. During 1910 these deposits were being developed by the Scheelite Mines Company, who are reported to have obtained very satisfactory results. In his summary report for 1910, Mr. Faribault refers to a new 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."

During 1911, the Scheelite Mines, Ltd., continued development work and erected a mill.

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 is being tested by Mr. Freeze of Doaktown, N.B., and Mr. Matthew Lodge of Moncton, who are interested therein.

