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CANADA
DEPARTMENT OF MINES

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MINES BRANCH

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PRELIMINARY REPORT

ON THE

MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR
1915

PREPARED BY

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EUGENE HAANEL, Ph.D.,
Director of Mines.

SIR,—I beg to submit herewith, the annual preliminary report on the mineral production of Canada in 1915.

The figures for production in 1915, while subject to revision, are based upon direct returns from mine and smelter operators and are fairly complete.

Special acknowledgements are due to those operators who have promptly furnished reports of their operations during the year.

When complete returns shall have been received the usual annual report will be prepared containing in greater detail the final statistics as well as information relating to exploration, development, prices, markets, imports and exports, &c.

I am, sir, your obedient servant,
JOHN McLEISH.

Division of Mineral Resources and Statistics,
February 21, 1916.

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR 1915

As a result of the demand created by the war, the metal mining industry has, in 1915, shown the highest production ever recorded and notwithstanding the greatly decreased production of materials of construction, such as cement, clay and stone quarry products, a very large increase is still shown in the total mineral output, over that of the previous year.

The total value¹ of the metal and mineral production in 1915, as shown in the preliminary report presented herein, was \$138,513,750, compared with \$128,863,075 in 1914, and \$145,634,812 in 1913, the latter being the highest production recorded. The increase in 1915 over 1914 was thus \$9,650,675, or 7.49 per cent, but the output is still less than that in 1913 by \$7,121,062.

Without attempting to discuss at length the effect of the war upon the Canadian mining industry, it may be remarked that the demand for the metals, copper, lead, nickel and zinc, led to great activity in the operation of the already developed deposits of these metals, and also, later in the year, to the opening up of old and the exploitation of new deposits. The capacities of steel furnaces were taxed to the utmost to meet the demand for shell steel.

The fact that under war conditions it was desirable that our metals should become available for commercial or national use, entirely within the country and that we should be less dependent, even upon a friendly neutral, for their recovery in smelters and refineries has stimulated the development of our smelting and refining operations.

Amongst non-metallic minerals the recovery of benzol and toluol in by-product coke oven operations was a direct result of the war, as was also the activity in the mining and shipment of magnesite and of chrome ores.

The limitation placed by the Government upon the export of certain minerals and metals may have caused inconvenience and interruption to certain industries but these were usually adjusted by the issue of special licenses for export where it could be shown that such export was not for enemy destination but was in the interest of Great Britain and her allies.

¹ In presenting a total valuation of the mineral production as is here given, it should be explained that the production of the metals copper, gold, lead, nickel, and silver is given as far as possible on the basis of the quantities of metals recovered in smelters, and the total quantities in each case are valued at the average market price of the refined metal in a recognized market. There is thus included in some cases the values that have accrued in the smelting or refining of metals outside of Canada.

THE MINERAL PRODUCTION OF CANADA IN 1915.

SUBJECT TO REVISION

Product.	Quantity.	Value.
METALLIC.		
		\$
Antimony.....Lbs.	961,040	192,208
Cobalt, metallic....."	211,610	502,388
Cobalt, oxide....."	379,219	42,193
Nickel, metallic....."	55,325	
Nickel, oxide....."	200,032	
Copper, value at 17.275 cents per pound....."	102,612,486	17,726,307
Gold.....Ozs.	916,076	18,936,971
Iron, pig. from Canadian ore.....*Tons	158,598	1,740,805
Iron ore, sold for export....."	93,444	187,682
Lead, value at 5.60 cents per pound.....Lbs.	45,377,065	2,541,116
Molybdenite....."	28,600	28,460
Nickel, value at 30 cents per pound....."	68,077,823	20,423,348
Silver, value at 49.684 cents per ounce.....Ozs.	28,401,735	14,088,397
Zinc ore.....Tons.	15,553	636,204
Total.....		77,046,082
NON-METALLIC.		
Actinolite.....Tons.	220	2,420
Arsenic, white....."	2,291	141,830
Asbestos....."	113,115	3,491,450
Asbestos....."	25,700	21,819
Chromite (a)....."	11,486	162,618
Coal....."	13,209,371	31,957,757
Corundum....."	262	33,138
Feldspar....."	15,455	59,124
Graphite....."	2,610	121,023
Grindstones....."	2,580	35,768
Gypsum....."	470,335	849,928
Magnesite....."	14,779	126,535
Manganese....."	47	5,460
Mica....."		81,021
Mineral pigments—		
Barytes....."	550	6,875
Ochres....."	6,248	48,353
Mineral water....."		118,796
Natural gas.....M. cu. ft.	18,319,710	3,300,825
Peat.....Tons.	300	1,050
Petroleum.....Brls.	215,464	300,572
Phosphate.....Tons.	217	2,502
Pyrites....."	296,910	1,028,678
Quartz....."	127,108	205,153
Salt....."	119,900	600,226
Talc....."	11,885	40,554
Tripolite....."	317	12,119
Total.....		42,755,594
STRUCTURAL MATERIALS AND CLAY PRODUCTS.		
Cement, Portland.....Brls.	5,681,032	6,977,024
Clay products—		
Brick: common, pressed, paving....."		2,341,483
Sewerpipe....."		795,646
Fireclay, drain tile, pottery, etc....."		781,071
Kaolin.....Tons.	1,300	13,000
Lime.....Bush.	4,932,767	1,015,878
Sand and gravel....."		2,098,683
Sand-lime brick.....No.	23,211,802	182,651
Slate.....Sq.	397	2,039
Stone—		
Granite....."		1,634,084
Limestone....."		2,504,731
Marble and Sandstone....."		365,784
Total structural materials and clay products.....		18,712,074
All other non-metallic.....		42,755,594
Total value, metallic.....		77,046,082
Grand total, 1915.....		138,513,750

* Tons of 2,000 pounds.

(a) Additional returns make total shipment: 14,291 tons value \$208,718—See "Chromite" in text.

The mining and metallurgical industries include a great variety of products so that in dealing with the industry as a whole the total value presents the only means of comparison, nevertheless quantities of production and prices are at all times the items of essential importance.

A comparison of the production of the more important mineral products in 1915 with that of 1914, is shown in the accompanying table.

Increase or Decrease in Principal Products, 1915.

Principal Products.	Increase (+) or Decrease (-) in Quantity.		Increase (+) or Decrease (-) in Value.	
		%	\$	%
Copper.....Lbs.	+ 26,876,526	35.49	+ 7,424,701	72.07
Gold.....Ozs.	+ 142,898	18.48	+ 2,953,964	18.48
Pig iron.....Tons.	+ 130,555	16.67	+ 1,589,963	15.90
Lead.....Lbs.	+ 9,039,300	24.88	+ 914,548	56.19
Nickel....."	+ 22,559,886	49.56	+ 6,767,967	49.56
Silver.....Ozs.	- 48,086	0.17	- 1,505,234	9.65
Total metallic.....			+ 17,659,463	29.73
Asbestos and Asbestic.....Tons.	+ 21,242	18.07	+ 603,463	20.74
Coal....."	- 428,158	3.14	- 1,514,044	4.52
Gypsum....."	- 46,545	9.90	- 306,279	26.49
Natural gas.....M. ft.	- 3,372,794	15.09	- 183,902	5.28
Petroleum.....Brls.	+ 659	0.31	+ 42,552	12.40
Pyrites.....Tons.	+ 68,596	30.04	+ 284,170	38.16
Salt....."	+ 12,862	12.02	+ 106,578	21.59
Cement.....Brls.	- 1,491,448	20.79	- 2,210,900	24.06
Clay products....."			- 2,940,757	32.01
Lime.....Bush.	- 2,095,815	28.92	- 344,750	33.94
Sand and Gravel....."			- 406,628	16.23
Stone....."			- 964,457	17.63
Total non-metallic.....			- 8,008,788	11.53
Grand total.....			+ 9,650,675	7.49

It will be observed that there has been an increased production in all metals with the exception of silver. The total value of the metallic production in 1915 was \$77,046,082 as compared with \$59,386,619 in 1914, and \$66,361,351 in 1913, the increase over 1914 being nearly 30 per cent, and that over 1913 the highest previous year, about 16 per cent. The production of nickel, copper and zinc are the highest that have been recorded in these metals. The quantity of nickel was 50 per cent greater than in 1914, copper over 35 per cent greater, lead nearly 25 per cent greater, gold over 18 per cent and pig iron nearly 17 per cent. The falling off in silver was only 48,000 ounces or less than two-tenths of one per cent. Owing to the high prices of copper and lead the total values of these metals show increases of 72 per cent and 56 per cent respectively.

Although the prices of nearly all metals have been high they have in most cases been exceeded in comparatively recent years except possibly in antimony and zinc, and some of the rarer metals.

Compared with 1914 the average price of copper shows an increase of 27 per cent, lead an increase of 27 per cent, spelter an increase of 154 per cent, antimony (ordinaries) an increase of 246 per cent, silver a decrease of 9.4 per cent and tin an increase of 12.2 per cent.

Metal Prices.

	1910.	1911.	1912.	1913.	1914.	1915.
	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.
Antimony (ordinaries)..... Per lb.	7.386	7.540	7.760	7.520	8.763	30.280
Copper, New York..... "	12.738	12.376	16.341	15.269	13.602	17.275
Lead..... "	4.446	4.420	4.471	4.370	3.862	4.673
" London..... "	2.807	3.035	3.895	4.072	4.146	4.979
" Montreal*..... "	3.246	3.480	4.467	4.659	4.479	5.600
Nickel, New York..... "	40.000	40.000	40.000	40.000	40.000	45.000
Silver..... Per oz.	53.486	53.304	60.835	59.791	54.811	49.684
Spelter..... Per lb.	5.520	5.758	6.943	5.648	5.213	13.230
Tin..... "	34.123	42.281	46.096	44.252	34.301	38.500

*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que.

The total value of the non-metallic production in 1915 including clay and quarry products, etc., was \$61,467,668 as against \$69,476,456 in 1914; \$79,273,461 in 1913. Compared with 1914 the decrease was \$8,008,788, or 11.5 per cent, while compared with 1913 the falling off was \$17,805,793 or 22.5 per cent.

It will be seen that the largest decreases in 1915 occurred in materials of construction such as cement, clay products, lime, sand and gravel, and stone and quarry products, the falling off varying from 16 to nearly 34 per cent. There was, however, also a smaller production of coal, natural gas and gypsum. On the other hand there were increases in the shipments of asbestos, chromite, graphite magnesite, pyrites and salt.

The record of mineral production by provinces shows the relative importance of the provinces in the same order as in the previous year with the exception that Quebec and Alberta change places, the former having the larger production in 1915. An increase in production is shown in the provinces of Nova Scotia, Quebec, Ontario, and British Columbia, and a decrease in New Brunswick, Manitoba, Saskatchewan, Alberta and the Yukon district. Ontario again has the largest output with a value of \$61,800,178, or 44.6 per cent of the total, and showing an increase over 1914 of \$8,765,501, or 16.5 per cent. British Columbia occupies second place with a value of \$28,932,658, or 20.9 per cent of the total and showing an increase of \$4,768,619, or 19.7 per cent over 1914; Nova Scotia is third with a production valued at \$18,126,672, or 13.1 per cent of the total and showing an increase of \$542,033, or 3.1 per cent over 1914. Quebec comes fourth with a value of \$12,159,436, or 8.8 per cent of the total, and an increase over 1914 of \$322,507, or 2.7 per cent. Alberta occupies fifth place with a production of \$9,915,282, or 7.2 per cent of the total and showing a decrease of \$2,768,952, or 21.8 per cent compared with 1914. The Yukon district mineral production including copper and coal as well as gold, is sixth, with a value of \$4,915,863, or 3.6 per cent of the total and a falling off from 1914 of \$502,322, or 9.3 per cent. Manitoba's production was \$1,351,604, a falling off of \$1,061,885, or 44 per cent. New Brunswick's production was \$916,329, a decrease of \$98,241, or 9.7 per cent, and the production of Saskatchewan was the smallest, being \$395,728, or less than that of 1914 by \$316,585, or 44.4 per cent.

Mineral Production by Provinces, 1914 and 1915.

	1914.		1915.		Increase (+) or Decrease (-).	
	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.		
	\$	%	\$	%	\$	%
Nova Scotia.....	17,584,639	13.68	18,126,672	13.09	+ 542,033	3.08
New Brunswick.....	1,014,570	0.79	916,329	0.66	- 98,241	9.68
Quebec.....	11,836,929	9.21	12,159,436	8.78	+ 322,507	2.72
Ontario.....	53,034,677	41.01	61,800,178	44.62	+ 8,765,501	16.53
Manitoba.....	2,413,489	1.88	1,351,604	0.97	- 1,061,885	44.00
Saskatchewan.....	712,313	0.55	395,728	0.28	- 316,585	44.44
Alberta.....	12,684,234	9.87	9,915,282	7.16	- 2,768,952	21.83
British Columbia.....	24,164,039	18.80	28,932,658	20.89	+ 4,768,619	19.73
Yukon.....	5,418,185	4.21	4,915,863	3.55	- 502,322	9.27
Dominion.....	128,863,075	100.00	138,513,750	100.00	+ 9,650,675	7.49

GOLD.

The total production of gold in placer and mill bullion and in smelter products in 1915 is estimated at 916,076 fine ounces valued at \$18,936,971, as compared with 773,178 fine ounces valued at \$15,983,007 in 1914, an increase of \$2,953,964 or 18.5 per cent. Although the production has more than doubled since 1907 it has not yet reached the high mark attained during Klondike's best years. The 1915 output was exceeded during each of the four years from 1899 to 1902.

Of the total production in 1915 about \$5,550,987 was derived from placer and alluvial mining, \$9,195,307 in bullion and refined gold and \$4,230,677 contained in matte, blister copper, residues and ores exported.

The production in Nova Scotia was about \$137,178, or over twice the output of the previous year. The pyrites ores of Quebec carry small quantities of gold and silver though the producers are not paid therefor. No placer recovery was reported from this province.

Ontario has now become the largest gold-producing province in Canada, the production in 1915 from fifteen properties being reported as \$8,386,956, or 44 per cent of the total production in Canada, as against a production in 1914 of \$5,545,509 an increase of \$2,841,447, or 51 per cent. The Hollinger and Acme Mines contributed about one-half of the output in 1915 and the Dome nearly one-fifth of the total.

No production of gold has been reported in either Manitoba or Saskatchewan although some development work has been done. From Alberta record has been obtained of the recovery of about \$4,000 of alluvial gold.

The production in British Columbia was \$5,628,982 including \$755,000 estimated by the provincial mineralogist as being the output of placer workings, and \$4,873,982 recovered from milling and smelting ores. In 1914 the production was \$5,224,393 including \$565,000 from placer workings and \$4,659,393 from milling and smelting ores.

The Yukon production in 1915, including a small recovery from copper ores, was \$4,755,721, a decrease of \$369,653 from the 1914 production. The amount of gold on which royalty was paid during the year 1915 according to the records of the Mining Lands and Yukon Branch, Interior Department, was 287,254.15 ounces, as against 309,691.17 ounces in 1914, and 352,900.04 ounces in 1913. For purposes of the royalty this gold is valued at \$15 per ounce although the actual value is probably

nearer \$16.50. The receipts at the Dominion of Canada Assay Office, Vancouver, were 87,284.35 ounces, valued at \$1,421,292.37 or an average of \$16.28 per ounce.

The exports of gold bearing dust, nuggets, gold in ore, etc., in 1915 are reported by the Customs Department as \$16,528,143.

SILVER.

The production of silver was 28,401,735 ounces valued at \$14,088,397 as against 28,449,821 ounces in 1914, valued at \$15,593,630. Silver is the principal metal that did not show an increased production in 1915. The falling off in quantity was very small however amounting to only 48,086 ounces. Owing to the lower price of silver the decrease in total value was \$1,505,234 or over 9.6 per cent.

Of the total production in 1915, 24,653,057 ounces, or about 86.8 per cent is credited to Ontario.

The production from the ores of Cobalt and other silver camps was 23,568,147 ounces including 19,893,639 ounces in bullion recovered in smelters and cyanide plants in Canada and 3,674,508 ounces estimated as recovered from ores exported to United States smelters. The quantity credited to gold ores was 84,910 ounces. The total production in 1914 was estimated at 25,139,214 compared with which the 1915 recovery shows a decrease of 1,571,067 ounces.

Of the silver in bullion 10,623,307 ounces were produced in smelters in Southern Ontario, and 9,270,332 ounces in the mills at Cobalt, the total in bullion being over 84 per cent of the production of the district.

The production in British Columbia, representing refined silver, silver contained in smelter products, and estimated recoveries from ores exported, was in 1915, about 3,628,727 ounces as compared with 3,159,897 ounces in 1914, an increase of 468,830 ounces, or over 14 per cent.

In Quebec province there is a small silver content in the pyrites ores shipped, while in the Yukon 58,382 ounces are estimated as being contained in the placer gold produced and recovered from copper ores.

The exports of silver bullion and silver in ore, etc., as reported by the Customs Department, were: 27,672,481 ounces valued at \$13,812,038.

The price of silver in New York varied between a minimum of 46½ cents in September and a maximum of 56 cents in December, averaging for the year 49.684 cents, a decrease of 5.127 cents from the average price in 1914.

COPPER.

The copper output in 1915 was the highest recorded. The production in smelters together with the estimated recoveries or amounts paid for in ores exported amounted to 102,612,486 pounds which at the average New York value of refined copper would be worth \$17,726,307. The highest previous production was in 1912 when an output of 77,832,127 pounds was reached. Compared with the production in 1914 which was 75,735,960 pounds valued at \$10,301,606 an increase is shown of 26,876,526 pounds or 35 per cent and in total value of \$7,424,701, or 72 per cent.

Of the total 1915 production 42,050,347 pounds were contained in blister copper, 44,230,052 in copper and copper nickel matte and 16,332,087 recovered from ores exported.

The production in Quebec from pyrites ores was 6,082,003 pounds as against 4,201,497 pounds in 1914.

The Ontario production is derived chiefly from the nickel-copper ores of the Sudbury district and of the Alexo mine, although there is a small amount of copper contained in the silver ores shipped from Cobalt, some of which is paid for. There was also a small shipment from the old Massey mine which was re-opened during the year.

The production in 1915 is reported as 39,303,279 pounds as against 28,948,211 pounds in 1914 an increase of 10,355,068 pounds or 35.7 per cent. Further detail respecting production will be found in the remarks on nickel.

British Columbia also shows a largely increased production in 1915, the total being 56,692,988 pounds as against 41,219,202 pounds in 1914 an increase of 15,473,786 pounds or 37.5 per cent. The 1915 production in this province included 47,064,234 pounds recovered in blister and matte etc., and 9,628,754 recovered from ores shipped to smelters outside of Canada. The Coast mines including the Britannia, Texada Island and Anyox mines, etc., are credited with 33,980,508 pounds and the Trail Creek and Boundary mines with 22,712,480 pounds.

The Yukon production is reported as 534,216 pounds as against 1,367,050 pounds in 1914.

The New York price of electrolytic copper rose from a minimum of 13 cents per pound in January to 20 cents in June, falling again to 16 cents in August, then rising steadily to the end of the year, reaching a maximum of 22 cents at the end of December. The average monthly price for the year was 17.275 cents, as compared with an average of 13.602 cents in 1914, an increase of 3.673 cents, or 27 per cent. This is the highest average monthly price since 1907, when 20.004 cents per pound was reached.

Exports of copper according to Customs records were; copper fine in ore, etc., and copper in pigs 102,729,579 pounds valued at \$12,460,356, there were also exports of old and scrap copper amounting to 4,161,600 pounds valued at \$616,553.

The total value of the imports of copper in 1915 are recorded as \$3,467,586 as against \$4,256,901 in 1914. The imports in 1915 included 16,818,116 pounds of copper in pigs, ingots and manufactures, valued at \$3,104,382; other manufactures valued at \$263,922, and copper sulphate 1,854,850 pounds, valued at \$99,282.

The imports in 1914 included 26,280,815 pounds crude and manufactured copper valued at \$3,983,322, copper sulphate 1,143,039 pounds valued at \$53,802 and other manufactures of copper valued at \$219,777.

NICKEL.

Refined metallic nickel is now being recovered in Canadian refineries but only in small quantities and as a by-product in the smelting and refining of the silver-cobalt-nickel ores of the Cobalt district, nickel oxide having been recovered in these smelters for several years. The nickel-copper ores of the Sudbury district supplemented by a small tonnage of similar ores from the Alexo mine in Timiskaming, north of Cobalt are the main sources of nickel production which in 1915 increased nearly 50 per cent as compared with 1914 and is greater than the production in 1913, the largest previous record, by over 37 per cent.

The nickel-copper ore, derived from 12 separate mines, is reduced in smelters and converters to a Bessemer matte containing from 77 to 82 per cent of the combined metals and shipped in that form to Great Britain and the United States for refining, the product of the Canadian Copper Company going to New Jersey and that of the Mond Nickel Company to Wales. A portion of the matte produced by the Canadian Copper Company is used without the intermediate refining of either metal for the direct production of Monel metal, an alloy of nickel and copper.

The total production of matte in 1915 was 67,703 tons, containing 39,216,165 pounds of copper and 68,077,823 pounds of nickel and valued by the producers at \$10,352,344. The tonnage of ore smelted (part being previously roasted) was 1,272,283. The production in 1914 was 46,396 tons of matte containing 28,895,825 pounds of copper and 45,517,937 pounds of nickel and valued at \$7,189,031.

The reported recovery of nickel from the ores of the Cobalt district was 55,325 pounds of metals and 200,032 pounds of nickel oxide. The recovery in 1914 was 392,512 pounds of nickel oxide.

The exports of nickel are reported by the Customs Department as 66,410,400 pounds valued at \$7,394,446 or an average of 11.13 cents per pound. Since about 80 per cent of the Canadian nickel production is exported to the United States, it may be of interest to add to the Canadian statistics a record of the imports (eleven months only in 1915) of nickel into and the exports from the United States.

The exports of nickel from the United States during the eleven months ending November were 24,503,585 pounds valued at \$9,299,234 or an average of 37.95 cents per pound. More than 50 per cent of these exports went to the United Kingdom. The value of the United States exports in 1914 ranged from 31 to 39 cents per pound and averaged about 34 cents.

It will be noted that a larger quantity of nickel finds its way to the United Kingdom through United States refineries than is exported directly from Canada.

The price of refined nickel in New York remained fairly constant during the first seven months of the year, quotations published by the Engineering and Mining Journal being 40 to 45 cents per pound for ordinary forms with 5 cents per pound more asked for electrolytic nickel. During the last five months of the year prices ranged between 45 and 50 cents for ordinary forms.

Production of Nickel in Canada.	1911.	1912.	1913.	1914.	1915.
	Tons.*	Tons.*	Tons.*	Tons.*	Tons.*
Ore mined.....	612,511	737,584	784,697	1,000,364	1,364,048
Ore smelted.....	610,834	725,065	823,403	947,053	1,272,283
Bessemer matte produced.....	32,607	41,925	47,150	46,396	67,703
Copper content of matte.....	8,966	11,116	12,938	14,448	19,608
Nickel.....	17,049	22,421	24,838	22,759	34,039
Spot value of matte.....	\$4,945,592	\$6,303,102	\$7,076,945	\$7,189,031	\$10,352,344
	1911.	1912.	1913.	1914.	1915.
Exports of Nickel from Canada.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Nickel contained in matte, etc.—					
Exported to Great Britain.....	5,023,393	5,072,867	5,164,512	10,291,979	13,748,000
Exported to United States.....	27,596,578	39,148,993	44,224,119	36,015,642	52,662,400
Exported to Other Countries.....			70,386	220,706	
	32,619,971	44,221,860	49,459,017	46,538,327	66,410,400
Imports of Nickel into United States	1911.	1912.	1913.	1914.	1915(a)
Gross tons of ore and matte..... Tons.	23,993	33,101	37,623	29,564	41,053
Nickel contents..... Lbs.	29,545,967	42,168,769	47,194,101	35,006,700	50,099,707
Exports of Nickel from United States—					
To France..... Lbs.	5,463,358	5,083,947	3,631,858	3,457,157	2,749,554
To Netherlands..... "	9,101,150	7,387,447	6,622,811	855,168	52,770
To United Kingdom..... "	7,196,259	8,191,364	8,221,640	10,836,369	13,570,574
To other Countries..... "	3,338,819	5,152,258	10,096,779	12,446,458	8,130,687
Total..... "	25,099,586	25,815,016	29,173,088	27,595,152	24,503,585

* In tons of 2,000 lbs.

(a) Eleven months only.

LEAD.

Although there was an increase of nearly 25 per cent in the production of lead the 1915 output has been exceeded in six of the past 15 years. The production of lead in 1914 was 45,377,065 pounds, which valued at 5.60 cents per pound, the average price of pig lead in Montreal for the year, would be worth \$2,541,116. The production in 1914 was 36,337,765 pounds valued at \$1,627,568, or an average of 4.479 cents per pound. The 1915 production consists chiefly of pig and manufactured lead produced at Trail, B.C., but includes also an estimate of the lead probably recoverable from ores shipped to smelters outside of Canada. The entire output of the Surprise mine in the Sloean District, B.C., was shipped to the United States, refined in bond, and sold in London.

The exports of lead in ore, etc., in 1915 are recorded by the Customs Department as 1,845,100 pounds valued at \$40,273, and of pig lead 2,066,929 pounds valued at \$79,067. Exports in 1914 were 246,100 pounds of lead in ore and 510,573 pounds of pig lead.

The total value of the imports of lead and lead products in 1915 was \$2,479,261 as against \$1,042,538 in 1914. The 1915 imports included 42,616,200 pounds valued at \$2,010,006, manufactured lead 3,102,838 pounds valued at \$184,581, other manufactures valued at \$102,439, litharge 1,579,800 pounds valued at \$89,232 and lead pigments 1,709,035 pounds valued at \$93,003. The imports of litharge and pigments would contain approximately 1,565 tons of metallic lead and the total import of lead would therefore exceed 24,425 tons as shown by this record. The imports in 1914 were equivalent to about 10,869 tons.

The average monthly price of lead in Montreal varied between a minimum of 4.27 cents in January and a maximum of 6.61 cents in De-

ember, averaging for the year 5.60 cents. This is the producer's price for lead in car lots as per quotations kindly furnished by Messrs. Thos. Robertson and Co.

The average monthly price of lead in New York was 4.628 cents and in London £22.917 per gross ton, equivalent to 4.979 cents per pound.

ZINC.

Complete returns of zinc shipments have not yet been received but the tonnage is estimated at 15,553 tons containing 12,400,000 pounds of zinc. Shipments include several hundred tons from Notre Dame des Anges, Quebec, but the greater part is from some fifteen properties in British Columbia. Zinc shipments in 1914 were reported as 10,893 tons containing 9,101,460 pounds of zinc.

The Consolidated Mining & Smelting Company at Trail, B.C., after successful experimental development has installed at Trail a zinc recovery plant, having an initial daily capacity of 35 tons of refined zinc, and has entered into a contract with the Shell Committee for a considerable tonnage of zinc to be delivered during 1916. A small quantity of zinc was recovered during 1915 in connection with the experimental work.

The Electric Zinc Company has constructed a plant at Welland, Ontario, for the recovery of refined zinc from zinc oxide. It is intended, eventually, to treat the zinc ores from Notre Dame des Anges, Quebec, at this plant.

At Silverton, B.C., a demonstrating plant, using the French process for the recovery of zinc, was operated during 1915 and satisfactory results are claimed.

In August the Dominion Government made an announcement with respect to a proposed bounty on zinc as follows:—

"Bounties on a sliding scale not exceeding two cents per pound will be granted upon production in Canada from Canadian ores of zinc containing not more than 2 per cent impurities, when the standard price of zinc in London, England, falls below £33 per ton of 2,000 pounds, provided that bounties shall not be payable on zinc produced before the expiration of the war or after the 31st day of July, 1917, or on zinc contracted for by the Shell Committee at a price of 8 cents or over per pound. Total amount of bounty to be paid not to exceed \$400,000."

The price of spelter in New York varied between a minimum of 5½ cents per pound in January and a maximum of 25 to 27 cents in June, the price at the close of the year being from 15½ to 16¾ cents and the average for the year 13.230 cents per pound.

The price of high-grade spelter rose from 10 cents at the beginning of the year to over 40 cents in midsummer and was maintained fairly strongly through the balance of the year at from 35 to 40 cents.

OTHER METALS.

Antimony: After several years of no production the demand and high prices in 1915 caused a renewal of activity in mining antimony ores at West Gore, Nova Scotia, and Lake George, New Brunswick. About 1,288 tons of concentrates were shipped to England from the former locality. The antimony smelter at Lake George was operated toward the end of the year with a small production of refined antimony, and there was also some recovery of refined antimony at the lead refinery at Trail, B.C.

Antimony ores are also reported to have been shipped from Carpenter Creek, Slocan, from Bridge River District, Lillooet, B.C., and from the Yukon but no record has been obtained. The total production reported is estimated at about 961,040 pounds of antimony refined and in concentrates.

The recorded exports of antimony ore in 1915 were 1,149 tons valued at \$82,990, while the imports included antimony or regulus of, etc., 1,962,194 pounds valued at \$344,918 and antimony salts 67,956 pounds valued at \$10,320.

The price of antimony, ordinary grades, in New York ranged between a minimum of 13 cents in January to a maximum of 42 cents in December, averaging about 30 cents for the year. The price of "Cooksons" in December was 55 cents per pound and the year's average 40 cents.

Cobalt: Metallic cobalt is now being recovered as well as cobalt oxide at the smelters at Deloro and Thorold. The silver-cobalt-nickel ores of the Cobalt district are reduced in these smelters, silver being the principal product with arsenious oxide, metallic cobalt and nickel, cobalt oxide and nickel oxide as by-products. Returns received show a production in 1915 of 211,610 pounds of metallic cobalt and 379,219 pounds of cobalt oxide, equivalent to a total of 477,063 pounds of metal. In 1914 the production was reported as 899,027 pounds of cobalt oxide and 242,572 pounds of cobalt contained in residues sold outside of Canada or equivalent to a total of 871,891 pounds of cobalt. The price of cobalt is seldom quoted in the Mining Journals. However, a price of \$2.00 per pound 97% cobalt metal was recorded by the Engineering and Mining Journal in September and November.

Molybdenum: A production has been reported of about 28,600 pounds of molybdenite valued at \$28,460, including cobbled molybdenite and molybdenite contained in ore shipped to concentration plants. There were also about 50 tons of low-grade ore sent to the Mines Branch Ore Testing laboratories for experimental concentration. The export of molybdenite was prohibited to other than British destinations except under license and from September 23rd the British Government requisitioned all molybdenite arriving in the United Kingdom at a price of 105 shillings per unit of MoS_2 C.I.F. Liverpool and appointed Messrs. H. A. Watson & Co., Liverpool, as buyers.

Platinum: Efforts are being continued to recover platinum from the gravels on the Tulameen river in the Similkameen district of British Columbia and there is also occasional recovery of small quantities from the gold gravels of Quesnel division, Cariboo district. A recovery of about 20 ounces is reported in 1915. There was no recovery of platinum from the Sudbury nickel-copper mattes.

Customs records show an export of platinum of 236 ounces valued at \$11,052, but this may possibly include old metal.

The price of refined platinum in New York which was about \$41 per ounce in January fell to \$38 in June and July, but increased to an average of \$85.50 in December. The year's average was about \$47.

IRON ORE.

Iron ore shipments in 1915 amounted to 398,112 short tons valued at \$774,427 as compared with 1914 shipments of 244,854 short tons valued at \$542,041. The 1915 shipments included hematite 205,989 tons, roasted siderite 132,906 tons, and cobbled magnetite and concentrates 59,217 tons.

The 1914 shipments included hematite 89,454 tons, roasted siderite 109,838 tons, and cobbled magnetite and concentrates 45,562 tons.

In the Great Lakes area the same ore prices prevailed as in 1914 and 1910 which were the lowest recorded in many years.

Mine operators report 93,444 tons of ore exported to the United States and 304,668 tons shipped to Canadian furnaces.

According to the records of the Customs Department exports of iron ore amounted to 79,770 tons valued at \$206,823 and imports of iron ore to 1,499,722 tons valued at \$2,320,066.

Shipments of iron ore from Wabana Mines, Newfoundland, in 1915, by the two Canadian companies operating there were 868,451 short tons of which 802,128 tons were shipped to Cape Breton and 66,323 tons to England. In 1914 the shipments were 639,430 short tons of which 422,920 tons went to Cape Breton and 216,510 to the United States and Europe.

PIG IRON.

The total production of pig iron in Canadian blast furnaces in 1915 was 913,719 short tons, valued at approximately \$11,592,819 as compared with a production of 783,164 short tons in 1914 valued at approximately \$10,002,856. A large proportion of this production is used directly in the manufacture of steel and the values are in part estimated. The 1915 output shows an increase of 130,555 tons or 16.67 per cent over that of 1914, and compares favourably with the average of recent years.

Of the total production in 1915, 13,692 tons were made with charcoal and 900,027 tons with coke.

Included in the ore charged to blast furnaces there was 293,305 short tons from Canadian mines and 1,463,681 tons of imported ore. Of the imported ore approximately 840,587 tons came from Newfoundland.

The blast furnace plants, operated for varying periods of time, included those of the Dominion Iron and Steel Company at Sydney, N.S., the Nova Scotia Steel and Coal Company at North Sydney, N.S., the Standard Iron Company at Deseronto, Ontario, the Steel Company of Canada at Hamilton, Ontario, the Canadian Furnace Company at Port Colborne, Ontario, and the Algoma Steel Company at Sault St. Marie, Ontario.

The production of pig iron by provinces in 1914 and 1915 was as follows:

	1914.			1915.		
	Tons.	Value.	Value per Ton.	Tons.	Value.	Value per Ton.
Nova Scotia.....	227,052	\$ 2,951,676	\$ 13 00	420,219	\$ 5,462,847	\$ 13 00
Ontario.....	556,112	7,051,180	12 68	493,500	6,129,972	12 42
	783,164	10,002,856	12 77	913,719	11,592,819	12 69

There was also in 1915 a production in electric furnaces of 10,794 tons of ferro-alloys (chiefly ferro-silicon with a very small tonnage of ferro-phosphorus) valued at \$753,406 as compared with a production in 1914 of 7,524 tons valued at \$478,355. About two-thirds of the ferro-silicon production in 1915 was of 50 per cent grade, and the balance was of 75 and 85 per cent grade.

The exports during 1915 of pig iron were 17,307 short tons valued at \$231,551 or an average per ton of \$13.38, and of ferro-silicon and ferro-compounds 9,238 tons valued at \$537,081, an average of \$50.81 per ton, or a total of 26,545 tons valued at \$768,632 as compared with a total in 1914 of 19,063 tons valued at \$486,366. The imports were 47,482 tons of pig iron valued at \$624,200, or an average of \$13.15 per ton, and 13,758 tons of speigeleisen, ferro-manganese and ferro-silicon valued at \$807,312, or a total of 61,240 tons valued at \$1,431,512.

Electro Metals, Ltd., producing ferro-silicon, have considerably enlarged the capacity of their plant at Welland, Ontario, to meet the increased demand for their product occasioned by the war. In addition to sales for Canadian consumption a large and important tonnage has been furnished to Great Britain, Russia and the United States.

STEEL INGOTS AND CASTINGS.

The production of steel ingots and castings in 1915 including 5,626 tons from electric furnaces, was 1,020,335 short tons, as compared with a production in 1914 of 828,641 tons. The 1914 production included open-hearth ingots 608,383 tons; bessemer ingots 203,184 tons; direct open-hearth castings 15,315 tons; and other steel castings 1,759 tons, these figures being a revision of those previously published.

ASBESTOS.

The asbestos production in 1915 was obtained from the same field in Quebec as heretofore. The output was less than in 1914, but sales showed an increase of about 17 per cent. Stocks on hand at the end of the year showed a noticeable decrease.

The total output in 1915 was 106,558 tons, as against 107,668 tons in 1914, showing a decrease of 1,110 tons or 1.03 per cent. The sales and shipments during 1915 were 113,115 tons valued at \$3,491,450, or an average of \$30.87 per ton, as against sales in 1914 of 96,542 tons valued at \$2,892,266 or an average of \$29.92 per ton. The 1915 sales were larger in quantity than those of 1914 by about 17 per cent and in value by about 20 per cent.

Stocks on hand at December 31st, 1915, were 22,052 tons, as compared with stocks on hand of 31,171 at the end of the previous year.

The number of men employed in the mines or quarries and mills were 2,393 and the amount paid in wages was \$1,089,976 as against 2,992 men employed in 1914 to whom was paid in wages \$1,283,977.

The total quantity of asbestos rock milled during the year is reported as 1,795,472 tons, which with a mill production of 102,571 tons shows an average estimated content of about 5.71 per cent of asbestos fibre in the rock. The estimated content of fibre in rock milled in 1914 was 6.03 per cent.

The output and sales of crude and mill stock are shown separately for 1914 and 1915 in the tables following. The classification is based on valuation: Crude No. 1 comprising material valued at \$200 per ton and upwards, and Crude No. 2 material valued at less than \$200 per ton; Mill stock No. 1 including mill fibre valued at \$30 and upwards, Mill stock No. 2, mill fibre valued at \$15 to \$30 per ton, and Mill stock No. 3 mill fibre valued at less than \$15 per ton.

Output Sales and Stocks in 1915.

	Output.	Sales.			Stock on hand, Dec. 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude No. 1.....	2,305.6	2,735.4	\$ 749,811	\$ 274.11	589.8	\$ 176,533	\$ 299.31
" 2.....	1,681.6	2,631.3	322,049	122.39	316.6	43,006	135.84
Mill stock No. 1.....	21,710	24,238	1,270,074	52.40	2,176	91,919	42.24
" 2.....	41,973	42,031	840,132	19.99	12,837	268,197	20.89
" 3.....	38,888	41,479	309,384	7.46	6,133	55,555	9.06
Asbestos.....	106,558.2	113,114.7	3,491,450	30.87	22,052.4	635,210	28.80
Asbestic.....		25,700	21,819	0.85			

Output Sales and Stocks in 1914.

	Output.	Sales.			Stock on hand, Dec. 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
Crude No. 1.....	1,450.6	1,335.9	\$ 402,417	\$ 301.23	984.3	\$ 301,237	\$ 306.04
" 2.....	2,611	2,812	370,776	131.87	1,411	187,338	132.78
Mill stock No. 1.....	16,144	19,388	932,893	48.12	4,616	229,361	49.69
" 2.....	58,362	47,851	963,973	20.15	15,114	305,809	20.23
" 3.....	29,101	25,155	222,207	8.83	9,046	76,522	8.46
Asbestos.....	107,668.6	96,541.9	2,892,266	29.96	31,171.3	1,100,267	35.30
Asbestic.....		21,031	17,540	0.83			

The total sales of crude asbestos in 1915 were 5,366.7 tons valued at \$1,071,860 or an average of \$199.72 per ton as against sales in 1914 of 4,147.9 tons valued at \$773,193 or an average of \$186.42 per ton.

The total sales of Mill stock in 1915 were 107,748 tons valued at \$2,419,590 or an average of \$22.46 per ton, as against sales in 1914 of 92,394 tons valued at \$2,119,073, or an average of \$21.64 per ton.

There was also a production of asbestic of 25,700 tons valued at \$21,819.

Exports of asbestos during the calendar year 1915 were 84,584 tons valued at \$2,734,695 or an average of \$32.45 per ton, as against exports of 81,081 tons in 1914 valued at \$2,298,646 or an average of \$28.35 per ton. There was also an export of asbestos sand amounting to 25,103 tons valued at \$157,410 or an average of \$6.27 per ton and of manufactures of asbestos valued at \$125,003.

Imports of asbestos manufactures for the year amounted to \$168,894.

CHROMITE.

From 1910 to 1914 inclusive no chromite was mined in Canada, and only a few small shipments were made from stock; but in 1915, according to returns received, shipments amounted to 11,486 tons,¹ valued at \$162,618.

In the early summer the demand for chromite in the United States led to considerable activity in the chromite-producing area in the vicinity of Black Lake and Coleraine, Quebec. Old dumps were picked over, and old pits re-opened. During the summer months ore averaging probably

¹ Further returns received would appear to show total shipments of 14,291 tons valued at \$208,718. However, the railway shipments from Coleraine, Black Lake, Thetford Mines and Robertson have been reported as 11,332 tons, and in view of the considerable local buying and selling there may be a possibility of duplication in production records.

less than 30 per cent Cr_2O_3 found a ready market, but towards the close of the year buyers were insisting on a 35 per cent ore.

The exports of chromite according to Customs records were 7,290 tons valued at \$81,838 or an average of \$11.23 per ton.

COAL AND COKE.

Coal: The total production of marketable coal for the year 1915 (comprising sales and shipments, colliery consumption, and coal used in making coke, or used otherwise by colliery operators), was 13,209,371 short tons valued at \$31,957,757, as against 13,637,529 tons valued at \$33,471,801 in 1914 showing a decrease of 428,158 tons, or 3.14 per cent in quantity, and of \$1,514,044 or 4.52 per cent in total value.

In estimating the values of the coals arbitrary values are assumed for the Nova Scotia and British Columbia production viz.: \$2.50 per long ton for the former and \$3.50 per long ton for the latter. The values used for coal production in the other provinces are those furnished by the operators.

The Nova Scotia production was 7,429,888 tons, an increase of 58,964 tons, or 0.8 per cent over that of 1914; the Alberta¹ production 3,320,431 tons, a decrease of 362,584 tons, or 9.8 per cent; the British Columbia production 2,089,966 tons, a decrease of 149,833 tons, or 6.7 per cent; the Saskatchewan production 236,940 tons, an increase of 4,641 tons, or about 2 per cent; the New Brunswick production 122,422 tons, an increase of 24,373 tons, or 24.85 per cent; and Yukon Territory, a production of 9,724 tons, a decrease of 3,719, or 28 per cent.

Province.	1913.		1914.		1915.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
Nova Scotia.....	7,980,073	\$17,812,663	7,370,924	\$16,452,955	7,429,888	\$16,584,573
British Columbia.....	2,714,420	8,482,562	2,239,799	6,999,374	2,089,966	6,531,144
Alberta.....	4,014,755	10,418,941	3,683,015	9,350,392	3,320,431	8,136,527
Saskatchewan.....	212,897	358,192	232,299	374,245	236,940	361,787
New Brunswick.....	70,311	166,637	98,049	241,075*	122,422	304,830
Yukon.....	19,722	95,945	13,443	53,760	9,724	38,896
Total.....	15,012,178	37,334,940	13,637,529	33,471,801	13,209,371	31,957,757

* Railway shipments.

The exports of coal in 1915 were 1,766,543 tons valued at \$5,406,058 as compared with exports of 1,423,126 tons in 1914 valued at \$3,880,175, an increase of 343,417 tons or 2.41 per cent.

The imports of coal in 1915 were made up as follows: bituminous round and run of mine; 6,106,794 tons, valued at \$7,564,369, or an average of \$1.24 per ton, bituminous slack 2,286,916 tons valued at \$2,027,256, or an average of \$0.89 per ton, and anthracite 4,072,192 tons valued at \$18,753,980 or an average of \$4.61 per ton, making a total of 12,465,902 tons valued at \$28,345,605.

Imports during 1914 included bituminous, round and run of mine 7,776,415 tons valued at \$14,954,321 or an average of \$1.92 per ton, bituminous slack 2,509,632 tons valued at \$3,605,253 or an average of \$1.43 per ton, and anthracite 4,435,010 tons valued at \$21,241,924 or an average of \$4.79 per ton, making total imports of 14,721,057 tons valued at \$39,801,498.

¹ Mr. Stirling, Chief Inspector of Mines, advises on February 26, that the 1915 output in Alberta, excluding unmarketable slack, was 3,299,969 tons.

The above figures show that in 1915 there was a decrease from imports of the previous year in quantity of 2,255,155 tons, or 15.3 per cent, and in value of \$11,455,893, or 28.78 per cent. The larger decrease in value is due to the average value of bituminous, round, and run of mine dropping from \$1.92 per ton in 1914 to \$1.24 per ton in 1915, and that of bituminous slack from \$1.44 to \$0.89.

The details of the decreases in imports are as follows: in bituminous, round and run of mine 1,669,621 tons or 21.5 per cent; in bituminous slack of 222,716 tons, or 8.9 per cent; and in anthracite of 362,818 tons or 8.2 per cent.

The apparent consumption of coal during 1915 was therefore 23,849,040 tons, as against a consumption the previous year of 26,852,323 tons. Canadian mines contributed 48 per cent of the domestic consumption, and the balance was imported. The total Canadian production was equivalent to about 53.4 per cent of the consumption.

Coke: The total output of oven coke during 1915 was 1,200,766 short tons made from 1,856,393 tons of coal of which 1,425,172 tons were of domestic origin, and 431,221 tons were imported. The total quantity of coke sold, or used by the producers during the year was 1,168,921 tons valued at \$4,253,536 or an average of \$3.64 per ton.

In 1914 the total output was 1,015,253 tons, and the quantity sold, or used by the producers, was 1,023,860 tons valued at \$3,658,514 or an average of \$3.57 per ton.

Returns for 1915 show a production of 0.647 tons of coke per ton of coal charged, as compared with 0.658 tons of coke per ton of coal charged in 1914.

The output of coke by provinces in 1915 was as follows: Nova Scotia 584,993 tons, an increase of 239,113 tons over 1914 production; Ontario 316,211 tons, a decrease of 61,303 tons; Alberta 24,187 tons, a decrease of 4,354 tons; and British Columbia 275,375 tons, an increase of 12,057 tons. The Ontario production was entirely from imported coal.

By-products from coke ovens which included 10,448 tons of ammonium sulphate, 7,365,931 gallons of tar, and 4,089,602 thousand cubic feet of gas, made in 1915 were in excess of the production in 1914; there was also for the first time a production of benzol and associated compounds. The production of trinitrotoluene near the close of the year was reported¹ by Col. Carnegie of the Shell Committee, as 100,000 pounds per week.

The ovens operated during the year were those at Sydney, Sydney Mines and Westville, Nova Scotia, Sault Ste. Marie, Ontario, Coleman, Albert, and Fernie, Michel, and Union Bay (Comox), British Columbia. At the close of the year there were about 1,742 ovens in operation, as contrasted with only 797 in operation at the end of 1914. Over 800 ovens at Stellarton and Londonderry in Nova Scotia, Port Arthur, Ontario, Lille and Passburg, Alberta, Carbonado and Hosmer, British Columbia, were idle throughout the year.

Imports of coke during 1915 amounted to 637,857 tons valued at \$1,608,464, and exports were 35,869 tons valued at \$160,053.

¹ Bulletin Can. Mining Institute. December, 1915, p. 902.

FELDSPAR.

The 1915 production of feldspar was 15,455 tons, valued at \$59,124 or an average of \$3.18 per ton as compared with a production in 1914 of 18,060 tons valued at \$70,824 or an average of \$3.92 per ton. The year's production is slightly less than the average of the preceding six years. As usual by far the greater proportion of the production came from Frontenac county, Ontario. It is of interest to note however that there has been a renewal of feldspar mining in Hull township, Quebec.

FLUORSPAR.

Fluorspar is obtained at Madoc, Ontario. There have been no shipments for three years, but the operators report having contracted for delivery of 1,000 tons in 1916.

Imports of fluorspar are not shown separately in the Customs records; imports of hydro-fluo-silicic acid in 1915 were 1,117,874 pounds valued at \$36,085.

GRAPHITE.

Shipments of milled and refined graphite amounted to 2,610 tons valued at \$121,023 or an average of \$46.37 per ton. This includes 76 tons from mills at Buckingham, Que. The major portion of the production came from Calabogie, Renfrew county, Ont., with a small tonnage from Mumfords, Hastings county. The production includes material varying in value from less than \$40 to over \$150 per ton. The 1914 production was 1,647 tons valued at \$107,203. Operators report a greatly increased demand with higher prices owing to the shortage in supplies in the United States from sources outside of America.

Exports of plumbago and of manufactures of plumbago were valued at \$96,325 according to Customs records.

GYPSUM.

The production of gypsum of all grades in 1915 is reported as 470,335 tons valued at \$849,928. This is lower than for several years, previous production having been 516,880 tons in 1914; 636,370 tons in 1913; and 578,454 tons in 1913. The Ontario production was practically the same as in 1914, while New Brunswick production showed a slight increase. In both Manitoba and Nova Scotia 1915 production showed a conspicuous decrease from that of the previous year.

Gypsum sold in 1915 was classified as follows: lump 342,467 tons; crushed 48,735 tons; fine ground 6,455 tons; and calcined 72,678 tons. In 1914 the tonnages of the various grades were: lump 351,729 tons; crushed 49,441 tons; fine ground 6,097 tons; and calcined 109,613 tons.

Exports of crude gypsum were 292,234 tons valued at \$336,380 being the smallest reported since 1908. Exports of ground gypsum which were valued at less than \$10,000 yearly for many years rose to a value of \$35,490 in 1914 and to a value of \$80,933 in 1915.

MAGNESITE.

The production of magnesite in 1915, chiefly crude but including some calcined, was 14,779 tons valued at \$126,535 in contrast with a yearly

average production from 1908 to 1914 inclusive of 621½ tons. The increased production was due largely to the urgent demands of steel companies and manufacturers of refractory brick.

All the production came from Grenville township, Argenteuil county, Quebec. From the Atlin district in British Columbia several hundred tons were shipped to Vancouver, but not marketed.

MANGANESE ORES.

In 1915 there was according to returns received to date, a production of 47 tons of manganese ore (90% Mn O₂) valued at \$5,460 or an average of \$116.17 per ton, as compared with a production in 1914 of 28 tons, valued at \$1,120 or an average of \$40.00 per ton.

The records of the Customs Department show exports of manganese ores amounting to 255 tons, valued at \$6,855, which would seem to indicate shipments additional to those reported.

The property at New Ross, Nova Scotia, formerly operated by the Nova Scotia Manganese Company was taken over in September and reopened by the Metals Development Company of Halifax.

NATURAL GAS.

Complete returns have not yet been received from some of the largest operators in Ontario. The 1915 production of natural gas therefore (subject to the corrections of the estimates used) was approximately 18,319,710 thousand cubic feet valued at \$3,300,825 contributed by provinces as follows: Ontario 13,510,071 thousand cubic feet valued at \$2,202,523; New Brunswick 430,692 thousand cubic feet valued at \$60,383, and Alberta 4,378,947 thousand cubic feet valued at \$1,037,919.

The production the previous year was reported as 21,692,504 thousand cubic feet valued at \$3,484,727 of which amount Ontario produced 14,094,521 thousand cubic feet valued at \$2,215,808; New Brunswick 425,826 thousand cubic feet valued at \$54,249, and Alberta 7,172,157 thousand cubic feet valued at \$1,214,670.

Ontario's production in 1915 showed a decrease of 584,450 thousand cubic feet, Alberta production a decrease of 2,793,210 thousand cubic feet, and New Brunswick production an increase of 4,866 thousand cubic feet.

The Ontario gas production came from the same fields in the southern portion of the province between Niagara Falls and Windsor, as heretofore. In 1914 and 1915 gas from the Kent fields was distributed as far east as Hamilton, a distance of 153 miles.

The New Brunswick production is obtained in Albert county and supplies chiefly Hillsborough and Moncton, while in Alberta, Medicine Hat and Bow Island are still the principal gas fields being utilized, supplying the district between Medicine Hat and Calgary.

PETROLEUM.

The annual production of crude petroleum which had been showing a steady decrease from 1907 to 1914 showed in 1915 a slight increase in quantity over the 1914 production. The value, though, was the lowest

recorded in the records of the Division which date back to 1885 for the average price per barrel in Western Ontario (from which nearly the entire Canadian production comes) was the lowest in several years.

A bounty of $1\frac{1}{2}$ cent per gallon is paid on the marketed production of crude oil from Canadian oil-fields through the Department of Trade and Commerce. From the bounty statistics it appears that the 1915 production in Ontario and New Brunswick was 215,464 barrels on which bounties amounting to \$113,118.45 were paid. The market value of this crude oil at \$1.39 $\frac{1}{2}$ per barrel amounted to \$300,572. In Alberta there was a small production of crude oil; but no bounty was paid on this as the specific gravity was below the standard set by the Petroleum Bounty Act, and complete records have not been furnished by the producers.

The total production of crude oil (exclusive of Alberta) in 1915 is therefore, 215,464 barrels, valued at \$300,572 as compared with a production in 1914 of 214,805 barrels valued at \$343,124.

The average monthly price of crude oil per barrel at Petrolia for the year was \$1.39 $\frac{1}{2}$ as compared with \$1.59 in 1914, and \$1.782 in 1913. For the first seven months of the year the average price was almost constant at \$1.30 $\frac{1}{2}$ per barrel but during the last five months it showed an increase month by month reaching a maximum of \$1.70 in December.

The Ontario production in 1915 was, according to the records of the Department of Trade and Commerce at Ottawa, 214,444 barrels. The production in barrels of the various fields, as furnished by the Supervisor of Petroleum Bounties at Petrolia, was as follows: Lambton 161,368; Tilbury 12,742; Bothwell 33,395; Dutton 5,401; Onondaga 1,490, and Belle River 46; giving a total of 214,442 barrels. In 1914 the production by fields was as follows: Lambton 154,186; Tilbury 18,530; Bothwell 33,961; Dutton 2,190; Onondaga 2,437; and Belle River 1,191; giving a total of 212,495 barrels.

The production in New Brunswick was 1,020 barrels as against 1,725 in 1914 and 2,111 in 1913.

Exports of petroleum entered as crude mineral oil in 1915 were 35,977 gals. valued at \$1,789, and of refined oil 103,488 gals. valued at \$14,107. There was also an export of naphtha and gasoline of 16,644 gals. valued at \$4,540.

The total value of the imports of petroleum and petroleum products in 1915 was \$8,047,781 as against a value of \$11,174,763 in 1914.

The total imports of petroleum oils, crude and refined, in 1915 were 236,923,765 gals., valued at \$7,979,264. The oil imports included, crude oil 192,588,487 gals. valued at \$3,678,021, refined and illuminating oils, 6,792,873 gals. valued at \$405,019; gasoline 28,030,972 gals. valued at \$2,693,717, lubricating oils 4,557,179 gals. valued at \$755,535, and other oils, products of petroleum 4,954,254 gals., valued at \$446,972. The oil imports in 1914 were: crude oil 195,207,210 gals. valued at \$5,750,971; refined and illuminating oils 12,833,065 gals., valued at \$970,481; gasoline 24,396,401 gals., valued at \$2,747,360; lubricating oils 5,767,676 gals., valued at \$940,143 and other oils, products of petroleum 6,283,621 gals., valued at \$663,407, making a total of 244,487,973 gals., valued at \$11,072,362.

The imports of petroleum products in 1915 included 980,662 pounds of paraffin and paraffin wax candles valued at \$68,517, as compared with imports in 1914 of 1,594,236 pounds valued at \$102,401.

PYRITES.

The production of pyrites in 1915 was 296,910 tons valued at \$1,028,678 of which 153,607 tons valued at \$614,428 was mined in Quebec, and 143,303 tons valued at \$414,250 was mined in Ontario. The 1914 production was 228,314 tons valued at \$744,508 of which 117,698 tons valued at \$470,792 came from Quebec and 110,616 tons valued at \$273,716 came from Ontario.

Exports of pyrites in 1915 were 137,598 tons valued at \$527,318, or an average of \$3.83 per ton, as compared with exports in 1914 of 89,888 tons valued at \$377,985, or an average of \$4.21 per ton.

Exports of sulphuric acid in 1915 amounted to 19,270,572 pounds valued at \$243,457, as against exports in 1914 of 7,485,509 pounds valued at \$45,612.

SALT.

The total sales of salt in 1915 were 119,900 tons, valued at \$600,226 (exclusive of the cost of packages) as compared with sales in 1914 of 107,038 tons, valued at \$493,648. The entire Canadian production of recent years has come from southwestern Ontario.

The Canadian Salt Co. in addition to selling salt, uses a portion of its production in its chemical works at Sandwich, Ontario, where caustic soda and bleaching powder are manufactured.

The exports of salt were 889,300 pounds, valued at \$5,836, as compared with exports in 1914 of 952,700 pounds, valued at \$5,229.

The total imports of salt in 1914 were 137,486 tons valued at \$517,526 and included 27,613 tons of fine salt in bulk, valued at \$84,449; 6,867 tons of salt in packages, valued at \$50,997, and 103,006 tons of salt imported for the use of fisheries, valued at \$382,080. The imports in 1914 were 142,646 tons, valued at \$540,881, including 26,065 tons of fine salt in bulk valued at \$82,149; 7,828 tons of salt in packages, valued at \$68,959; and 108,753 tons of salt for the use of sea or gulf fisheries, valued at \$389,773.

TALC.

The production of talc was about the same as in the two preceding years the 1915 shipments being 11,885 tons, valued at \$40,554.

The output of talc, all of which comes from the vicinity of Madoc, Ontario, is marketed in both crude and ground form in the United States and Canada.

CEMENT.

The general decrease in production of structural materials and clay products which was a feature in 1914 was repeated in 1915, the production in the latter year being valued at \$18,712,074, as against a production in 1914 valued at \$26,009,227.

The total quantity of Portland cement, including natural Portland, made in 1915 was 5,153,763 barrels of 350 pounds each, as compared with 8,727,269 barrels in 1914, a decrease of 3,563,506 barrels, or about 40 per cent.

The total quantity of Canadian Portland cement sold or used during 1915 was 5,681,032 barrels, valued at \$6,977,024 or an average of \$1.228 per barrel, as compared with 7,172,480 barrels, sold or used in 1914, valued at \$9,187,924, or an average of \$1.28, showing a decrease in quantity of 1,491,448 barrels, or about 20 per cent.

The total imports of cement in 1915 were 98,664 cwt. equivalent to 28,190 barrels of 350 pounds each, valued at \$40,426, or an average of \$1.434

per barrel, as compared with imports of 98,022 barrels, valued at \$147,158, or an average of \$1.50 per barrel in 1914.

The total consumption of cement, therefore, neglecting a small export, was 5,709,222 barrels, as compared with a consumption of 7,270,502 barrels in 1914, showing a decrease of 1,561,280 barrels, or about 21 per cent.

The average price per barrel at the works in 1915 was \$1.228 as compared with \$1.28 in 1914, \$1.27 in 1913, \$1.28 in 1912, and \$1.34 during 1911 and 1910.

The imports of cement in 1915 included 1,065 barrels, valued at \$1,480 from Great Britain, and 27,125 barrels, valued at \$38,946, from the United States.

Production and Sales of Portland Cement.

	1912	1913	1914	1915
	Brls.	Brls.	Brls.	Brls.
Portland Cement sold or used	7,132,732	8,658,805	7,172,480	5,681,032
" manufactured	7,141,404	8,886,333	8,727,269	5,153,763
Stock on hand Jan. 1st	894,822	862,067	1,073,328	2,020,022
" Dec. 31st	903,094	1,089,595	2,628,117	2,062,961
Value of cement sold or used	\$ 9,106,556	\$11,019,418	\$ 9,187,924	\$6,977,024
Wages paid	\$ 2,623,902	\$ 3,466,451	\$ 2,271,006	\$ 1,180,882
Men employed	3,461	4,276	2,977	1,679

Consumption of Portland Cement.

Calendar Year.	Canadian.		Imported.		Total.
	Barrels.	Per cent.	Barrels.	Per cent.	Barrels.
1911	5,692,915	90.0	661,916	10.0	6,354,831
1912	7,132,732	83.3	1,434,413	16.7	8,567,145
1913	8,658,805	97.1	254,093	2.9	8,912,988
1914	7,172,480	98.7	98,022	1.3	7,270,502
1915	5,681,032	99.5	28,190	0.5	5,709,222

Exports of Products of the Mine and Manufactures of Mine Products, Calendar Year 1915.

(Compiled from Trade and Navigation Statements).

Products.	Quantity.	Value.
Arsenic	Cwt. 46,364	\$ 174,190
Asbestos	Tons. 84,584	2,734,695
Asbestos sand	" 25,103	157,410
Coal	" 1,766,543	5,406,058
Chromite	" 7,290	81,838
Feldspar, Magnesite, Talc, etc.	"	148,915
Gold	"	16,528,143
Gypsum, crude	Tons. 292,234	316,380
Copper, fine, in ore, etc.	Lbs. 81,437,063	8,671,641
" black, or coarse, and in pigs ..	" 21,292,516	3,788,715
Lead, in ore, etc.	" 1,845,100	49,273
" pig, etc.	" 2,066,929	79,067
Nickel, in ore, etc.	" 66,410,442	7,394,446
Platinum	" 236	11,052
Silver	Ozs. 27,672,481	13,812,038
Mica	"	236,124
Mineral Pigments	Lbs. 879,631	17,263
Mineral water	Cwt. 23,916	53
Oil, mineral, crude	Gals. 198	1,789
" refined	" 35,977	14,107
Ores:—		
Antimony	Tons. 1,149	82,990
Corundum	" 339	37,798
Iron	" 79,770	206,823
Manganese	" 255	6,855
Other ores	" 23,816	798,214

Exports of Products of the Mine and Manufactures of Mine Products, Calendar Year 1915—Continued

Products.	Quantity.	Value.
		\$
Phosphate.....Tons.	179	1,860
Plumbago, crude ore, etc.....Cwt.	5,254	12,009
Pyrites.....Tons.	137,598	527,318
Salt.....Cwt.	8,893	5,836
Sand and Gravel.....Tons.	808,022	380,549
Stone, ornamental....."	29,976	12,764
" building....."	35,804	28,910
" crushed....."	42,716	24,453
" for manufacture of grindstones....."	180	900
Other products of the mine....."		53,106
Total mine products.....		61,814,582
MANUFACTURES.		
Agricultural implements:—		
Mowing machines.....No.	5,031	175,912
Cultivators....."	5,957	166,602
Reapers....."	471	21,105
Drills....."	6,400	422,772
Harvesters and Binders....."	7,668	809,141
Ploughs....."	14,923	309,286
Harrow....."	4,459	81,731
Hay Rakes....."	1,758	40,289
Seeders....."	2	87
Threshing machines....."	1,001	568,401
All other....."		302,355
Parts of....."		519,379
Asbestos, manufactures of....."		125,003
Bricks.....M.	1,155	9,089
Cement....."		5,161
Clay, manufactures of....."		25,202
Coke.....Tons.	35,869	160,053
Drugs:—		
Acetate of lime.....Lbs.	10,001,830	205,748
Acid sulphuric....."	19,270,572	243,457
Calcium carbide....."	102,017,471	3,160,950
Phosphorus....."	545,050	77,476
Earthenware and all manufactures of....."		11,281
Fertilizers....."		2,335,297
Grindstones, manufactured....."		35,334
Gypsum or Plaster, ground....."		80,933
Iron and Steel, and manufactures of:—		
Stoves.....No.	1,271	18,563
Gas buoys and parts of....."		2,017
Castings, N.O.P....."		143,714
Pig iron.....Tons.	17,307	231,551
Ferro-silicon and ferro-compounds....."	9,238	537,081
Wire and wire nails.....Cwt.	1,439,950	3,224,740
Machinery:—		
Linotype machines and parts of....."		6,946
Sewing machines.....No.	2,557	30,479
Washing machines....."		20,334
Typewriters....."	3,175	206,811
Machinery, N.O.P....."		556,162
Scrap iron and steel.....Cwt.	1,787,155	883,134
Hardware, viz.: tools, hand or machine....."		321,021
Hardware, N.O.P....."		401,053
All other, N.O.P....."		31,147,770
Lime....."		15,617
Metals:—		
Aluminium in bars, etc.....Cwt.	186,808	3,333,726
" manufactures of....."		620,562
Brass, old and scrap.....Cwt.	120,685	1,468,165
Copper, old and scrap....."	41,616	616,553
Metallic shingles, etc....."		66,635
Metals, N.O.P....."		878,258
Mineral and aerated waters (in bottles)....."		3,525
Oil, gasoline and naphtha.....Gals.	16,644	4,540
" N.O.P....."	1,247,376	290,943
Plumbago, manufactures of....."		84,316
Stone, ornamental....."		5,990
" building....."		660
Tar....."		37,331
Tin, manufactures of....."		173,206
Vehicles:—		
Automobiles.....No.	13,475	6,756,305
" parts of....."		363,178
Bicycles.....No.	116	4,692
" parts of....."		15,547
		62,343,279
Grand Total.....		124,157,861

Mineral Production in Canada 1914.

(Revised).

Product.	Quantity. (a).	Value. (b).
METALLIC.		
Cobalt oxide.....	Lbs. 899,027	} 606,593
Nickel oxide.....	" 392,512	
Cobalt material, mixed cobalt and nickel oxides.....	" 2,079,001	79,995
Copper, value at 13.602c per lb.....	" 75,735,960	10,301,606
Gold.....	Ozs. 773,178	15,983,007
Iron, pig from Canadian ore, (c).....	Tons. 95,744	1,138,912
" ore sold for export.....	" 60,410	135,300
Lead, value at 4.479c per lb.....	Lbs. 36,337,765	1,627,568
Molybdenum ore.....	Tons. 16	2,063
Nickel, value at 30c per lb.....	Lbs. 45,517,937	13,655,381
Silver, value at 54.811c per oz.....	Ozs. 28,449,821	15,593,631
Zinc ore.....	Tons. 10,893	262,563
Total.....		59,386,619
NON-METALLICS.		
Actinolite.....	Tons. 119	1,304
Arsenious oxide.....	" 1,737	104,015
Asbestos.....	" 96,542	2,892,266
Asbestic.....	" 21,031	17,540
Chromite.....	" 136	1,210
Coal.....	" 13,637,529	33,471,801
Corundum.....	" 548	72,176
Feldspar.....	" 18,060	70,824
Fluorspar.....	" Nil.	
Graphite.....	" 1,647	107,203
" artificial.....	" 617	
Grindstones.....	" 3,976	54,504
Gypsum.....	" 516,880	1,156,207
Magnesite.....	" 358	2,240
Manganese.....	" 28	1,120
Mica.....	"	109,061
Mineral Pigments:—		
Barytes.....	" 612	6,169
Ochres.....	" 5,890	51,725
Mineral Water.....		134,111
Natural gas.....	M. cu. ft. 21,692,504	3,484,727
Peat.....	Tons. 685	2,470
Petroleum (d).....	Bbbls. 214,805	343,124
Phosphate.....	Tons. 954	7,275
Pyrites.....	" 228,314	744,508
Quartz.....	" 54,148	84,583
Salt.....	" 107,038	493,648
Talc.....	" 10,808	40,418
Tripolite.....	" 650	13,000
Total.....		43,467,229
Cement, Portland.....	Bbbls. 7,172,480	9,187,924
Clay products:—		
Brick, common.....	No. 457,513,762	3,653,861
" pressed.....	" 93,634,858	1,115,556
" paving.....	" 2,707,000	49,627
" moulded and ornamental.....	" 1,554,496	23,592
Fireclay and fireclay products.....		107,568
Fireproofing and architectural terra-cotta.....		405,543
Kaolin.....	Tons. 1,000	10,000
Pottery.....		35,371
Sewerpipe.....		1,104,409
Tile, drain.....		366,340
Lime.....	Bus. 7,028,582	1,360,628
Sand-lime brick.....	No. 70,650,030	609,515
Sand and gravel.....		2,505,310
Slate.....	Sq. 1,075	4,837
Stone:—		
Granite.....		2,176,602
Limestone.....		2,672,781
Marble.....		132,533
Sandstone.....		487,140
Total.....		26,009,227
Grand Total.....		128,863,075

(a) Quantity of product sold or shipped. Tons of 2,000 pounds.

(b) The metals, copper, lead and silver are for the purpose of these statistics valued at the prices of the metals as quoted in recognized markets. Nickel is valued at less than market price because a considerable portion of the output is marketed as monel metal and sold at a price less than that of nickel.

(c) The total production of pig iron in Canada in 1914 was 783,164 tons of which it is estimated 95,744 tons should be credited to Canadian ore and 687,420 tons to imported ore.

(d) Production based on claims made for bounty.



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Annual Mineral Production in Canada Since 1886.

Year.	Value of production.	Value per capita.	Year.	Value of production.	Value per capita.
	\$	\$ cts.		\$	\$ cts.
1886.....	10,221,255	2 23	1901.....	65,797,911	12 16
1887.....	10,321,331	2 23	1902.....	63,231,836	11 36
1888.....	12,518,894	2 67	1903.....	61,740,513	10 83
1889.....	14,013,113	2 96	1904.....	60,082,771	10 27
1890.....	16,763,353	3 50	1905.....	69,078,999	11 49
1891.....	18,976,616	3 92	1906.....	79,286,697	12 81
1892.....	16,623,415	3 39	1907.....	86,865,202	13 75
1893.....	20,035,082	4 04	1908.....	85,557,101	13 16
1894.....	19,931,158	3 98	1909.....	91,831,441	13 70
1895.....	20,505,917	4 05	1910.....	106,823,623	14 93
1896.....	22,474,256	4 38	1911.....	103,220,994	14 42
1897.....	28,485,023	5 49	1912.....	135,048,296	18 27
1898.....	38,412,431	7 32	1913.....	145,634,812	18 77
1899.....	49,234,005	9 27	1914.....	128,863,075	15 96
1900.....	64,420,877	12 04	1915.....	138,513,750