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PRELIMINARY REPORT

OF THE

MINERAL PRODUCTION OF
CANADA

DURING THE CALENDAR YEAR
1919

PREPARED BY

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FEBRUARY 28, 1920

OTTAWA

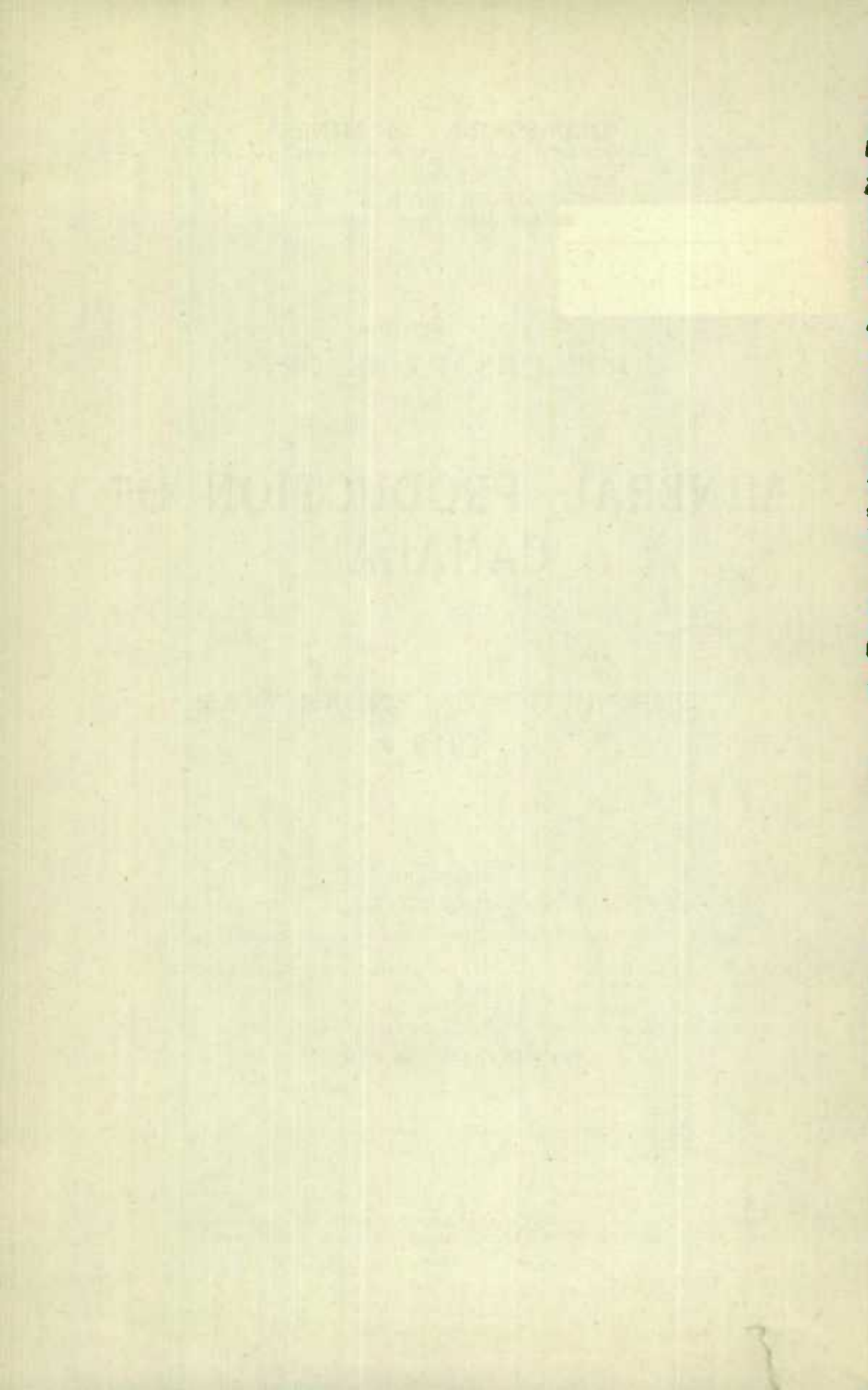
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PRELIMINARY REPORT
ON
THE MINERAL PRODUCTION OF CANADA
DURING THE CALENDAR YEAR 1919.

Estimates of the total probable value of the mineral production of Canada during 1919 made on the first of January last were short about 3.6 per cent of the preliminary figures now available. Sufficient allowance had not been made for the increased production and increased value of cement, clay, quarry and other similar structural material products. The coal mining industry too, during the last three months of the year responded quickly and extensively, particularly in the Province of Alberta, to the heavy demand for fuel.

The present preliminary report is based upon direct returns received from mine and smelter operators and although these are not complete or final, sufficient data is available on which to base a fairly accurate record.

A tabulated statement of mineral production is supplemented by a brief review of each of the more important metals and mineral products.

In reviewing the industry as a whole it is customary to express the total mineral production and to make comparisons of production of different years or districts in terms of dollars or total values. The wide range of prices through which many metals and mineral products have passed during the past five years and the continuation of high prices for many products have of course resulted in greatly increasing the total value of the mineral production, even when the actual quantities of metals or minerals obtained might be decreasing. It is evident that less importance should be given to comparisons in values and that more stress should be laid upon quantity comparisons. This may be readily done with individual products, but appears less feasible when dealing with totals of a great variety of products.

The total estimated value ⁽¹⁾ of the metal and mineral production in 1919 was \$173,075,913 which is less than the total value reached during each of the three preceding years. Compared with the production in 1918 valued at \$211,301,897 a decrease of \$38,225,984 or 18 per cent is shown.

Just as the declaration of war in 1914 was followed by a short period of industrial dislocation before the activity necessitated by the war's requirements became fully launched, so following the cessation of hostilities there has been an interregnum, or transition period, during which the war's demands are being replaced by the legitimate requirements of peace industries and the demands of reconstruction.

The difficulties of making these readjustments have been aggravated by social upheavals and strikes.

The net falling off in mineral production in 1919 has been a mean between a large decrease in the production of metals, coal and many "war minerals"

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, silver and zinc 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.

Mineral Production in Canada, 1919.

(Subject to revision).

		Quantity.	Value.
METALLIC.			\$
Antimony ore (exports).....	*Tons	56	8,420
Cobalt, metallic and contained in oxide, etc. at \$2.50 per lb.....	Lbs.	336,185	840,462
Copper, value at 18.601 cents per lb.....	"	75,124,653	14,011,949
Gold.....	Ozs.	767,167	15,858,742
Iron, pig from Canadian ore.....	Tons	38,457	899,436
Iron ore, sold for export.....	"	5,883	46,822
Lead, value at 6.966 cents per lb.....	Lbs.	43,895,888	3,057,753
Molybdenite (exports).....	"	113,520	84,228
Nickel, value at 40 cents per lb.....	"	44,542,953	17,817,181
Platinum.....	"	(d)	
Silver, value at 111-122 cents per oz.....	Ozs.	15,675,134	17,418,522
Zinc, value at 7.338 cents per lb.....	Lbs.	31,738,859	2,328,998
Total			72,401,829
NON-METALLIC.			
Actinolite.....	Tons.	80	880
Arsenic, white and in ore.....	"	3,192	508,770
Asbestos.....	"	136,199	10,658,946
Asbestos.....	"	18,786	54,087
Barytes and Manganese.....	"		18,713
Chromite.....	"	8,360	224,971
Coal.....	"	13,586,300	54,051,700
Feldspar.....	"	15,944	91,472
Fluorspar.....	"	5,063	97,887
Graphite.....	"	1,322	92,444
Grindstones.....	"	2,063	61,304
Gypsum.....	"	306,947	1,217,344
Magnesite.....	"	11,073	328,232
Magnesium Sulphate.....	"	771	7,304
Mica.....	"		273,304
Mineral Water.....	"		146,909
Natural Gas.....	M cu. ft.	21,750,091	4,071,472
Oxides.....	Tons	11,862	115,227
Peat.....	"	986	6,541
Petroleum, crude.....	Brls.	240,970	744,677
Phosphate.....	Tons	24	301
Pyrites.....	"	177,487	522,704
Quartz.....	"	105,055	247,385
Salt.....	"	130,842	1,308,407
Talc.....	"	18,642	116,295
Tripolite.....	"	550	11,000
Total			74,919,392
STRUCTURAL MATERIALS AND CLAY PRODUCTS.			
Cement, Portland.....	Brls.	4,991,340	9,783,393
Clay products (\$7.657,938.).....	"		
Brick, common.....	No.	293,918,891	3,723,033
" pressed.....	"	67,587,295	1,257,833
Fireproofing.....	Tons		359,882
Hollow Building Blocks.....	No.	2,202,000	63,275
Kaolin.....	Tons	759	13,744
Pottery.....	"		4187,574
Refractories: fire clay, etc.....	"		6380,934
Sewerpipe.....	Tons	56,287	1,061,010
Terra Cotta.....	"		2,861
Tile, drain.....	No.	19,161,718	607,792
Lime, (c).....	Bus.	6,999,706	2,268,432
Sand-Lime brick.....	No.	28,219,399	377,040
Sand and gravel (not complete).....	Tons	3,906,247	1,687,991
Slate.....	Sq.	1,632	10,853
Stone (\$3,960,045).....	"		
Granite.....	"		668,111
Limestone.....	"		2,708,625
Marble.....	"		213,982
Sandstone.....	"		78,327
Total Structural Materials and clay products			25,754,692
All other Non-Metallic			74,919,392
Total value Metallic			72,401,829
Grand Total, 1919			\$173,075,913

*Short tons throughout. dExcluding \$704,846 from imported material. bExcluding \$73,180 from imported material.
 c 27,950 tons hydrated lime marketed, valued at \$295,164. dReturns incomplete—see text. eAdditional returns give a total of 148,302 tons valued at \$1,398,968.

Increase or Decrease in Principal Products, 1919.

Principal Products.		Increase (+) or Decrease (-) in quantity.		Increase (+) or Decrease (-) in value.	
		\$	%	\$	%
Copper.....	Lbs.	- 43,644,781	36.7	- 15,208,987	52.0
Gold.....	Ozs.	+ 67,486	9.6	+ 1,395,060	9.6
Pig Iron from Canadian ore.....	Tons	- 8,987	18.9	- 305,297	25.3
Lead.....	Lbs.	- 7,502,114	14.6	- 1,696,527	35.7
Nickel.....	"	- 47,964,340	51.9	- 19,185,736	51.9
Silver.....	Ozs.	- 5,708,845	26.7	- 3,275,182	15.8
Zinc.....	Lbs.	- 3,344,316	9.5	- 533,438	18.6
Total metallic.....				- 42,147,323	36.8
Asbestos and Asbestos.....	Tons	- 3,204	2.1	+ 1,742,236	19.4
Coal.....	"	- 1,391,626	9.3	- 1,141,176	2.1
Gypsum.....	"	+ 154,660	101.5	+ 394,339	47.9
Magnesite.....	"	- 28,292	71.9	- 688,300	67.7
Mica.....	"			+ 1,765	0.6
Natural Gas.....	M cu. ft.	+ 1,609,782	8.0	- 279,368	6.4
Petroleum.....	Brls.	- 63,771	20.9	- 149,466	15.9
Pyrites.....	Tons	- 234,129	56.9	- 1,182,515	69.3
Quartz.....	"	- 163,100	60.8	- 382,428	60.7
Salt.....	"	+ 16,575	12.6	+ 113,929	8.9
Cement.....	Brls.	+ 1,399,859	39.0	+ 2,706,890	38.3
Clay products.....	"			+ 3,074,449	67.1
1919	Bush.	+ 635,755	10.0	+ 392,407	20.9
Stone.....	"			+ 932,471	30.7
Total non-metallic.....				+ 3,921,339	4.1
Grand Total Decrease.....				- 38,225,984	18.1

Metal Prices.

(In cents per pound or ounce.)

	1914.	1915.	1916.	1917.	1918.	1919.
Antimony (ordinaries)..... Per pound.	8.763	30.280	25.370	20.690	12.581	.....
Copper, New York.....	13.602	17.275	27.202	27.180	24.628	18.691
Lead, ".....	3.862	4.673	6.858	8.787	7.413	5.759
London.....	4.146	4.979	6.715	8.626	6.270	6.211
Montreal.....	4.479	5.600	8.513	11.137	9.250	6.966
Nickel, New York.....	40.000	45.000	45.000	50.000	46.250	45.000
Silver, "..... Per ounce.	54.811	49.684	63.061	81.417	96.772	111.122
Solder, "..... Per pound.	5.213	13.230	12.804	8.901	8.159	7.338
Tin, ".....	34.301	38.500	43.480	61.802	68.750	63.180

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

(a) No regular quotations received for January and February, 1918.

Mineral Production by Provinces, 1918 and 1919.

	1918.		1919.		Increase (+) or Decrease (-)	
	Value of Production.	Per cent of total.	Value of Production.	Per cent of total.		
	\$	%	\$	%	\$	%
New Scotia.....	22,317,108	10.56	23,213,751	13.4	+ 896,643	4.02
New Brunswick.....	2,144,017	1.01	1,675,006	1.0	- 469,011	21.85
Quebec.....	19,605,347	9.28	21,341,829	12.3	+ 1,736,482	8.86
Ontario.....	94,694,093	44.82	63,842,826	38.0	- 28,851,267	30.46
Manitoba.....	3,220,424	1.53	2,846,505	1.07	- 373,919	11.61
Saskatchewan.....	1,019,781	0.48	1,118,055	0.7	+ 98,274	9.64
Alberta.....	23,109,987	10.94	20,815,049	12.0	- 2,294,938	9.93
British Columbia.....	42,835,509	20.27	34,258,267	19.8	- 8,577,242	20.02
Yukon.....	2,355,631	1.11	1,963,965	1.1	- 391,666	16.63
Dominion.....	211,301,897	100.00	173,075,913	100.00	- 38,225,984	18.1

such as chromite, graphite, magnesite, pyrites, etc., on the one hand and large increases in the production of structural materials such as cement, clay products, lime and building stone and also of asbestos, gypsum and salt.

The metallic production in 1918 was valued at \$114,549,152, which fell in 1919 to \$72,401,829, a decrease of \$42,147,323 or 36.8 per cent. Gold is the only metal of which there was an increased production. The falling off in the quantities of other metals varied from 9.5 per cent in zinc to nearly 52 per cent in nickel.

The total value of the non-metallic production including clay and quarry products in 1919 was \$100,674,084 as compared with \$95,752,745 in 1918 showing an increase of \$3,921,339 or 4.1 per cent. The cement, clay and stone products alone were valued at \$25,754,692, as against \$19,130,799 in 1918, an increase of \$6,623,893, or over 34 per cent. The total value of non-metallic products other than structural materials was \$74,919,382 as against \$77,621,946 a decrease of \$2,702,554 or 3.4 per cent.

COPPER.

The production of copper in 1919 amounted to 75,124,653 pounds (37,562.3 tons) which at the average price in New York of 18.691 cents per pound, would be worth \$14,041,549, as against 118,769,434 pounds (59,384.7 tons) valued at \$29,250,536, or an average of 24.628 cents per pound in 1918; showing a decrease of 36.7 per cent in quantity and 52.0 per cent in total value. The 1918 production had been the highest recorded. That of 1919 is the lowest since 1911.

Of the total production 54,320,182 pounds were contained in blister copper and in matte produced in Canada, part of which was refined at Trail, B.C., and Port Colborne, Ont., the balance being exported for refining and 20,804,471 pounds estimated as recovered from ores exported to United States smelters.

The total production of refined copper in 1919 was 3,487 tons, practically all produced at the electrolytic refinery of the Consolidated Mining and Smelting Company at Trail, B.C., though a few tons were also produced at the refinery of the International Nickel Company of Canada, at Port Colborne, Ont. The major part of the copper production at this plant is in the form of blister. The production of refined copper in 1918 was 3,809 tons and in 1917 it was 3,901 tons.

The production in Quebec from pyritic ores was 2,691,695 pounds valued at \$1,445,577 in 1919. These ores are nearly all shipped primarily for their sulphur content. The copper is treated as a by-product and the figures of production are the quantities reported as being paid for, the actual metal contents of the ores being much higher. The production in 1918 was 5,869,649 pounds.

The production in Ontario amounted to 24,361,934 pounds valued at \$4,443,489, as against 47,074,475 valued at \$11,593,502 in 1918. This production is derived from the nickel-copper ores of the Sudbury District, and of the Alexo mine in Timiskaming, supplemented by a small recovery from the silver ores of the Cobalt District, and the copper ores of the Bruce mine, Sudbury District.

The production in Manitoba amounted to over three million pounds as against a production of over two million pounds in 1918 and was derived from a rich chalcopyrite lens found in the Mandy ore deposits at Schist lake, north-west of The Pas. About 25,000 tons of this ore were mined containing 18 to 20 per cent copper, 0.10 ounces of gold and about 2½ ounces of silver per ton.

Both this property and the Flin Flon on the east side of Flin Flon lake have been extensively developed and a large tonnage of low grade ore determined. The rich ore lens on the Mandy having been exhausted, operations were

curtailed in the latter part of 1919 awaiting the construction of a railroad and the possible erection of a smelter in the district to permit the treatment of the low grade ores.

The production from British Columbia was 44,388,934 pounds valued at \$8,296,735 as against 62,965,681 pounds valued at \$15,482,560 in 1918. The production included 26,774,800 pounds recovered as blister copper, refined copper and copper sulphate and 17,614,134 pounds being the estimated recoveries from ores exported to American smelters.

The production from the Yukon is estimated at 334,090 pounds valued at \$62,445 as against 618,878 pounds valued at \$152,663 in 1918, which were derived from the copper ores of the Whitehorse District.

Prices.—The fixed price of copper had been increased by the United States Government in July, 1918, to 26 cents per pound, but in December there was no market, though the producers endeavoured to maintain a price of 23 cents. No market developed in the early part of the year and the price dropped to a little below 15 cents in March. The agreement between the American Government and the producers in April, 1919, for the disposal of the copper held by the Government gave the market more firmness and the price gradually increased, reaching a maximum of about 23½ cents in July,—then declined to about 18½ cents in December.

The exports from Canada in 1919 were: Copper, fine, in ore, matte, regulus, etc., 20,426 tons, valued at \$5,316,151; blister copper 9,978 tons valued at \$3,747,355; in pigs, bars, sheets, etc., 9,096 tons valued at \$4,186,549; and copper "old and scrap," 1,558 tons valued at \$537,225 giving a total of 41,058 tons valued at \$13,787,280. The total exports in 1918 were 60,536 tons, valued at \$20,772,109.

The imports of copper in ingots, bars and manufactured form 1919 were valued at \$3,088,903 as against a reported value of \$6,373,361 in 1918. The quantity imported in 1919 would approximate 19,000 tons. The imports in 1918 were probably not less than 20,000 tons.

GOLD.

The total production of gold in 1919 amounted to 767,167 fine ounces valued at \$15,858,749, as against 699,681 fine ounces valued at \$14,463,689 in 1918, an increase of 9.64 per cent.

Of the total 1919 production, 104,259 ounces or 13.6 per cent was direct from placer or alluvial mining; 532,238 ounces, or 69.4 per cent was in the form of bullion; 47,611 ounces or 6.2 per cent was in the form of refined gold; and 83,059 ounces or 10.8 per cent in blister copper, residues, and ores exported.

The production in Nova Scotia was only 940 ounces, as against 1,176 ounces in 1918. This is the smallest production obtained in any one year in this province the records of which have been published for 58 years. The largest production was 112,226 ounces in 1899.

The production in Quebec amounted to 1,470 ounces as against 1,939 ounces in 1918, and, as usual, is derived from the pyrites ores of the Eastern Townships and the zinc-lead ores of Notre Dame des Anges, Portneuf county. Much of this gold is not paid for by the smelters.

The production in Ontario in 1919 was 508,380 ounces valued at \$10,509,147 as compared with 411,976 ounces valued at \$8,516,299 in 1918 and constituted 66.2 per cent of the total production of Canada. The 1919 production exceeded the record of 1916 which was the previous maximum.

The production from Manitoba was 611 ounces as against 1,926 ounces in 1918 and was derived from the gold and copper ores of the Pas district, northern Manitoba.

The British Columbia production in 1919 amounted to 165,319 ounces valued at \$3,417,447 as against 180,163 ounces valued at \$3,724,300 in 1918. The production for the last four years has been much below the usual production of five to six million dollars per year.

The production from the Yukon Territory amounted to 90,447 ounces valued at \$1,869,705 as against 102,474 ounces valued at \$2,118,325 in 1918. In addition to the production from the alluvial sands, there is included a small production from the gold and copper ores of Conrad and Whitehorse districts. There has been a gradual falling off in production since 1913 when a production of nearly six million dollars was reported.

The exports of mine gold bullion, gold bearing dust, nuggets, gold in ore, etc., in 1919 are recorded as \$5,037,123, as against \$10,040,813 in 1918, and \$15,929,051 in 1917.

LEAD.

The production of lead in 1919 is estimated at 43,895,888 pounds valued at \$3,057,788, or an average price of 6.966 cents per pound, as against 51,398,000 pounds valued at \$4,754,315, or an average price of 9.250 cents, showing a decrease of 14.60 per cent in quantity and 35.68 per cent in value. The values are calculated on the average price of lead in Montreal.

The lead production represents the quantity of refined lead and pig lead produced in Canada from the treatment of Canadian ores, together with the lead estimated as recovered from ores exported to the United States.

The 1919 production included 16,446 tons of refined lead produced at Trail, B.C., and 720 tons of pig lead produced at Galetta and Kingston, Ontario.

The lead ores exported amounted to 10,015 tons with a metal content of 10,437,351 pounds of lead and were derived mostly from the mines of East and West Kootenay, British Columbia, supplemented by shipments from Notre Dame des Anges, Quebec.

The total mine shipments of lead ores and concentrates were about 57,813 tons containing approximately 40,400,000 pounds of lead.

The record of lead contents of ores and concentrates shipped and recoveries in smelters from domestic and imported ores are presented for comparison, together with a record of pig and refined lead produced.

	1916.	1917.	1918.	1919.
	Lbs.	Lbs.	Lbs.	Lbs.
(1) Lead contents of ores and concentrates shipped from mines in Canada.....	54,124,628	38,696,116	46,843,602	40,400,000
(2) Production: Smelter recoveries from Canadian ores and recoverable lead in ore exported.....	41,497,615	32,576,281	51,398,002	43,895,888
(3) Total production of refined lead in Canada (including lead from imported ores).....	33,087,474	32,115,114	31,571,112	32,892,000

The exports of lead in 1919 were: Lead contained in ores, concentrates, etc., 13,142,900 pounds valued at \$616,278, and pig lead 11,326,800 pounds valued at \$772,734, as against 22,684,100 pounds of lead in ores, etc., valued at \$1,321,890 and 7,461,700 pounds of pig lead valued at \$668,807 in 1918.

The average Montreal price of lead was 6.94 cents per pound in January, then decreased slightly to 6.25 cents in April, to increase gradually reaching a maximum of 8.32 cents for December.

This is the producer's price for lead in car lots as per quotations furnished by Messrs. Thos. Robertson & Company.

MOLYBDENUM.

The signing of the Armistice was followed by a collapse in the market for molybdenite, so that practically all producers had to cease operations. Thus the 1919 production was greatly curtailed. Returns from the operators are incomplete, but the exports of molybdenite are reported by the Customs Department as 113,520 pounds valued at 84,228 or an average value of 75.2 cents per pound.

The total production in 1918 representing the quantity of MoS_2 contents of the concentrates shipped for which payment was made amounted to 378,029 pounds which at \$1.15 per pound would be worth \$434,733.

The total shipments in 1918 of ores and concentrates were 461.3 tons valued at \$428,807 and there were 33,935 tons of ore treated at the concentrating plants.

Most of the production has been derived from the mines at Quyon, Quebec.

The price of molybdenite in New York which averaged \$2.25 per pound in January, 1918, gradually declined to \$1 in August, 1918, and 87 cents in December. In 1919 the price declined to 75 cents per pound and sales were made as low as 50 cents and even 40 cents.

NICKEL.

The total production of nickel in 1919 amounted to 44,542,953 pounds, which at 40 cents per pound, would be worth \$17,817,181 as against 92,507,293 pounds valued at \$37,002,917 in 1918.

The production, as usual, represents the nickel in the matte produced from the treatment of the ores of the Sudbury district and the Alexo mine at Porquis Junction, Ontario, supplemented by the recovery of a small quantity of metallic nickel, nickel oxides and other salts, as by-products in the treatment of the silver-cobalt-nickel ores of the Cobalt district.

Sudbury District.—The production of nickel-copper matte at the smelters of the International Nickel Company of Canada, and the Mond Nickel Company, amounted to 42,736 tons containing 12,098.7 tons of copper and 12,035.3 tons of nickel, the average percentage of the combined metals in the matte being about 80. The production in 1918 was 87,184 tons of Bessemer matte containing 45,885.6 tons of nickel and 23,482.3 tons of copper. There were mined in 1919 572,400 tons of ore and smelted 754,567 tons, as against 1,641,617 tons mined and 1,559,892 tons smelted in 1918.

Refined metallic nickel has been recovered in Canada since 1915, but previous to 1918 only in small quantities, and as a by-product in the smelting and refining of the silver-cobalt-nickel ores, as stated above.

The new refinery of the International Nickel Company of Canada, Ltd., at Port Colborne, Ontario, started operations in July, 1918.

The total production in Canada of refined nickel from both the Sudbury and Cobalt district ores amounted to 5,063 tons, as against 1,204.5 tons in 1918. The other products recovered were: 581.4 tons of nickel oxides valued at \$340,033 as against 282.4 tons valued at \$169,447 in 1918; 199.6 tons of nickel salts and nickel castings valued at \$46,358 as against 186.3 tons valued at \$39,598 in 1918.

The British America Nickel Corporation practically completed in 1919 the construction of its smelter at Murray mine and of the refinery at Deschenes, Quebec.

The smelter started operations January 18, 1920, and the refinery will probably soon be in operation.

The capacity of the plant will be about 7,000 tons of nickel and 3,500 tons of copper per annum.

There has also been erected a refinery for precious metals, and refined platinum, palladium, iridium, gold and silver will be produced.

The International Nickel Company's plant at Port Colborne reported for 1919 a production of the metals: platinum, palladium, gold and silver.

The exports in 1919 were: Nickel fine 10,621,000 pounds valued at \$3,292,420, or an average of 31 cents per pound, and of nickel in ore, matte, speiss 30,395,400 pounds valued at \$4,785,173 or 15·7 cents per pound, as against nickel fine 1,710,800 pounds valued at \$707,206 or an average of 41·34 cents per pound, and nickel in ore, etc., 85,767,700 pounds valued at \$10,556,040, or an average of 12·31 cents per pound in 1918.

The imports of nickel into the United States during 1919, which included small quantities from other sources as well as from Canada, are recorded in the reports of the Department of Commerce, Washington, as 29,303,228 pounds contained in ore, matte or other form and valued at \$5,780,380, or an average of 19·73 cents per pound, and 7,335,761 pounds of refined or manufactured nickel valued at \$2,643,882, or an average of 35·9 cents per pound. The exports from United States of nickel, nickel oxide, etc., were 3,814,762 pounds valued at \$1,701,549, or an average of 44·61 cents per pound. The value per pound of these exports from the United States to different countries ranged from 36·6 cents to 60·5 cents. The average value per pound of the exports in 1918 was 39·7 cents the range being 35·1 cents to 53·4 cents.

The price of electrolytic nickel in New York according to quotations published by the "Engineering and Mining Journal" was 45 cents per pound throughout the year.

Production of Nickel in Canada.		1915.	1916.	1917.	1918.	1919.
<i>From nickel copper ores:</i>						
Ore mined.....	Tons	1,364,048	1,566,333	1,518,783	1,641,617	572,169
Ore smelted.....	"	1,272,283	1,521,689	1,453,661	1,559,892	754,567
Bessemer matte made.....	"	67,703	80,011	78,897	87,184	42,736
Copper content of matte.....	Lbs.	30,216,165	44,859,321	42,392,588	46,964,651	24,197,382
Nickel content of matte.....	"	68,077,823	82,596,862	83,773,319	91,771,288	44,070,609
<i>From Silver-Cobalt-Nickel ores:</i>						
Nickel as metal or contained in oxide, etc.....	"	231,634	361,702	556,961	736,005	.....
Exports of Nickel from Canada,						
(Total).....	Lbs.	66,410,400	80,441,700	82,272,400	87,678,500	41,016,400
Nickel in matte or speiss.....	"	66,410,400	80,331,700	82,272,400	85,767,700	30,395,400
Nickel refined.....	"	.....	.....	.....	1,910,800	10,621,000
Exported to Great Britain.....	"	13,748,000	11,136,900	10,506,400	13,007,600	4,617,900
Exported to United States.....	"	52,662,400	69,304,800	70,766,000	74,613,800	34,881,500
Exported to other countries.....	"	.....	.....	.....	57,100	1,517,000
Imports of Nickel into United States.						
Gross tons of ore and Matte.....		45,798	59,741	61,053	59,621	23,057
Nickel contents.....	Lbs.	56,352,582	72,611,492	75,510,793	73,193,205	29,303,228
Manufactures of nickel.....	"	.....	.....	.....	24,974	7,355,761
Exports of Nickel from United States:						
To France.....	Lbs.	3,018,354	2,823,132	1,232,142	2,233,736	1,346,119
Italy.....	"	2,487,939	2,715,521	5,470,042	5,100,847	525,940
Netherlands.....	"	129,557	523,463	.....	.....	61,197
Russia in Europe.....	"	3,992,069	7,767,875	168,000	.....	.....
United Kingdom.....	"	14,761,595	16,674,487	14,409,272	7,803,178	747,437
Japan.....	"	890,571	245,920	275,018	2,063,933	582,946
Russia in Asia.....	"	444,374	1,148,366	.....	.....	.....
Other countries.....	"	693,221	1,505,247	438,346	267,806	551,123
Total.....		26,418,550	33,404,011	21,992,820	17,469,500	3,814,762

PLATINUM.

The most important sources of the metals of the platinum group in Canada are those of the nickel-copper ores, but, due to the fact that these precious metals occur in very small quantities per ton of ore and the difficulty of

recovering them in refining operations, no attempt had been made previous to 1919 to recover these metals in Canada.

The International Nickel Company of Canada report for 1919 a recovery, in an impure state, of about 25 ounces of platinum and 62 ounces of palladium with also a small quantity of fine gold and silver.

During the past ten years there has been a more or less irregular recovery in New Jersey of metals of the platinum group from the residues left in the refining of the Sudbury mattes, as residues from other sources were treated along with those from the Canadian ores, the total recovery could not be credited to the Canadian ore deposits; nevertheless, it is believed that the Sudbury mattes have been the source of the greater part of the platinum group metals recovered. Records of these recoveries have been published in the Annual Reports on mineral production and the recoveries in 1918 included 649.7 ounces of platinum, 786.6 ounces of palladium and 472.5 ounces of rhodium.

The British America Nickel Corporation will soon have in operation its refinery at Deschenes, Que., and as the electrolytic method of refining which is to be used here lends itself much more readily to the recovery of the precious metals, a substantial recovery of platinum group metals in Canada may be anticipated.

The returns from the operations of alluvial sands of the Similkameen district are yet incomplete—but the Provincial Mineralogist of British Columbia reports a production in 1919 valued at \$1,500 as being derived from the gold placer operations.

The exports of platinum in 1919 are reported by the Customs Department as follows, viz.: Platinum in ore, concentrates, etc., 325 ounces valued at \$28,815, and platinum "old and scrap" 346 ounces valued at \$33,814.

The price of platinum in 1919 decreased from \$105 per ounce in January to \$97.50 in March, then increased again gradually, reaching \$105 in May; \$110 in June, rising more rapidly to a maximum of \$150 in December.

SILVER.

The total production of silver in 1919 is estimated at 15,675,134 fine ounces valued at \$17,418,522, as against 21,383,979 ounces valued at \$20,693,704 in 1918, a decrease of 26.7 per cent in quantity and 15.8 per cent in value.

Of the total production 1,843,368 ounces, or 75.6 per cent was produced as bullion and refined silver; 2,925,238 ounces, or 18.6 per cent estimated as recovered from ores exported; and 906,528 ounces, or 5.8 per cent as contained in blister copper.

The production in Quebec amounted to 140,926 ounces as against 178,675 ounces in 1918, and was derived as usual from the pyritic ores of the Eastern Townships and the zinc-lead ores of Notre Dame des Anges, Portneuf county.

The production in Ontario which is derived mostly from the ores of Cobalt and adjoining silver districts, amounted to 11,934,179 ounces, or 76.1 per cent of the total production of Canada. In 1911 when the Cobalt district production was at its maximum the percentage was 93.8. Of the total Ontario production 5,918,310 ounces, or 49.6 per cent were recovered in the mills and reduction plants of Cobalt; 4,390,540 ounces, or 36.7 per cent were recovered in southern Ontario smelters; 1,511,874 ounces, or 12.7 per cent were the estimated recoveries from ores, residues, or mill products treated in United States; and 113,455 ounces, or 1.0 per cent was the production from the gold mines and that produced at the refinery at Port Colborne.

The production in Manitoba was 20,760 ounces as against 13,316 ounces in 1918 and was derived from the gold and copper ores of the Pas district, northern Manitoba.

The British Columbia production was 3,554,598 ounces valued at \$3,949,940 as against 3,921,336 ounces valued at \$3,794,755 in 1918, a decrease in quantity of 9.4 per cent but an increase in value of 4.1 per cent. This production includes refined silver 1,379,963 ounces, silver contained in smelter products 906,528 ounces, and the estimated recoveries from ores exported 1,268,107 ounces.

The Yukon production was 24,671 ounces as against 71,915 ounces and is derived mostly from the alluvial sands with also a small recovery from the gold and copper ores.

The New York price of silver in 1919 remained fixed at the maximum of 101½ cents per ounce until May 6, when restrictions were withdrawn and the price increased rapidly to an average of 110 cents in June and gradually to a maximum of 137½ cents in the latter part of November. The year closed with the price at 131 cents. The average monthly price having been 111.122 cents per ounce.

ZINC.

The zinc production in 1919 amounted to 31,738,859 pounds, or 15,869.4 tons which at the average price for the year of 7.338 cents per pound would be worth \$2,328,998, as against 35,083,175 pounds or 17,541.6 tons, valued at \$2,862,438, or an average of 8.159 cents per pound in 1918.

The production included 12,326 tons of refined zinc produced at Trail, B.C., and 3,543 tons being the estimated recoveries from 10,556 tons of ore and concentrates shipped to United States smelters (20 per cent being allowed for smelter losses).

The total zinc ore and concentrates shipments in 1919 amounted to approximately 133,623 tons with a metal content of 58,415,053 pounds as against 121,200 tons containing 63,006,464 pounds of zinc in 1918.

The production was derived from the lead-zinc mines of British Columbia with the exception of 1,752,000 pounds credited to Ontario.

The production of refined zinc was in 1919 12,326 tons, as against 12,574 tons in 1918; 9,985 tons in 1917; and 2,974 tons in 1916, the first year that commercial zinc was reported as produced in Canada.

The exports of zinc in 1919 as reported by the Department of Customs were: zinc ore and concentrates 6,630 tons valued at \$296,212, or an average of \$44.68 per ton; and spelter 7,693,800 pounds valued at \$701,249. In 1918 the exports of zinc ores and concentrates were reported as 10,545 tons valued at \$476,791, or an average of \$45.21 per ton.

The reports of the United States Department of Commerce, give the following records: Imports of zinc in ore from Canada in 1919, 7,555,189 pounds valued at \$115,974, as against 10,346,214 pounds valued at \$319,815 in 1918, and 10,310,388 pounds valued at \$338,668 in 1917.

The imports of zinc as reported by the Customs Department in 1919 were valued at \$1,865,531 as against a total value of \$2,804,027 in 1918.

IRON ORE.

The shipments of iron ore from Canadian mines were in 1919 the lowest that have been recorded in 19 years and amounted to a total of 195,970 tons valued at \$686,386 as compared with 211,608 tons valued at \$885,893 shipped in 1918. The shipments in 1919 included 321 tons of titaniferous ore mined some years previously at Baie St. Paul on the north shore of the St. Lawrence, several car-loads from properties in Palmerston township, Frontenac county, and Bastard

township, Leeds county, Ontario, and the balance from the Moose Mountain magnetite mines and the Magpie siderite mine.

The Magpie siderite mine in the Michipicoten district of Ontario was operated throughout the year by the Algoma Steel Corporation the siderite ore being roasted as usual in the rotary kiln plant at the mine. About 189,962 tons of roasted ore were produced and shipped to the blast furnace plant at Sault Ste. Marie. The raw ore averages about 34.3 per cent and the roasted ore about 50 per cent metallic iron.

Messrs Moose Mountain, Limited, operating at Sellwood, Ont., were actively engaged throughout the year in the development of the milling and briquetting processes which are being employed in the treatment of these low grade magnetites. The raw ore averaged about 33.8 per cent iron, while the briquettes produced averaged about 63.8 per cent iron. Over 100,000 tons of raw ore was milled during the year but only a comparatively small quantity, 5,483 short tons of briquettes were marketed.

In the Great Lakes region ore prices from the 1st October, 1918, were: Old Range Bessemer, \$6.65 per gross ton (basis 55 per cent iron); Messabi Bessemer \$6.40; Old Range Non-Bessemer \$5.90 (basis 51.5 per cent iron); Messabi Non-Bessemer \$5.75. From April 28, 1919, these prices were reduced by 20 cents per ton.

Of the total shipments in 1919 mine operators reported 5,883 tons as exported to the United States and 189,962 tons shipped to Canadian blast furnaces. The Customs Department records show exports of iron ores to the United States during the year of 14,480 tons valued at \$78,490 and imports of iron ore amounting to 1,683,098 tons valued at \$4,706,440.

The quantity of iron ore charged to blast furnaces in 1919 was 1,752,585 tons of which 78,391 tons were of domestic origin and 1,674,194 tons imported. The imported ore included 519,722 tons of Newfoundland ore and 1,154,472 tons of "Lake Ore". Shipments of iron ore from Wabana Mines, Newfoundland in 1919 by the two Canadian companies operating there were 499,972 short tons as against 848,574 tons in 1918, all of which went to Sydney and North Sydney in Cape Breton.

PIG IRON.

The total production of pig-iron in Canada in 1919 excluding the production of ferro-alloys was 917,346 short tons, (819,059 gross tons) having a value of \$24,536,432 as compared with a total production in 1918 of 1,195,551 short tons (1,067,456 gross tons) valued at \$33,495,171 showing a falling off of 278,205 tons, or 23 per cent. Of the 1919 total 910,080 tons were made in blast furnaces and 7,266 tons (subject to revision) were made in electric furnaces from scrap metal, chiefly shell-turnings. In 1918 the blast furnace production was 1,163,510 tons and the electric furnace production from scrap steel was 32,031 tons.

The production of blast furnace pig-iron in Nova Scotia in 1919 was 285,087 tons as against 415,870 tons in 1919 and with the exception of 1914 was the smallest production in that province since 1905. In Ontario the production of blast furnace pig-iron was 624,993 tons, as against 747,650 tons in 1918. Although less by 16 per cent than in the previous year, the 1919 production in Ontario was exceeded in only four previous years.

Less than one quarter as much pig-iron was made from electric furnaces from scrap steel as in the previous year the output being derived from six furnace plants in 1919 as compared with 10 plants operated in 1918.

By grades the 1919 production included: Basic 580,426 tons; Bessemer 7,637 tons; foundry and malleable, etc., 322,017 tons; low phosphorus iron (electric furnace) 7,266 tons. The 1918 production included: Basic 966,409 tons; Bessemer 15,415 tons; foundry and malleable, etc., 181,696; low phosphorus iron (electric furnace) 32,031 tons.

The blast furnace plants operated included those of the Dominion Iron and Steel Company at Sydney, N.S.; the Nova Scotia Steel and Coal Company at North Sydney; the Standard Iron Company at Deseronto, Ont.; The Steel Company of Canada at Hamilton, Ont.; The Canadian Furnace Company at Port Colborne, Ont.; The Algoma Steel Corporation, Ltd., at Sault Ste. Marie, Ont.; The Midland Iron and Steel Co. at Midland, Ont., and the Parry Sound Iron Co., Ltd., at Parry Sound, Ont.

Electric furnaces were operated for the production of pig-iron from scrap at Hull and Shawinigan Falls in Quebec, at Belleville and Welland in Ontario, and at Vancouver, British Columbia.

The production of ferro-alloys in Canada in 1919 including ferro-silicon, silico spiegel, spiegeleisen and ferro-phosphorus all with the exception of the speigeleisen being made in electric furnaces was about 48,579 tons valued at \$1,998,779. In 1918 the production was 44,704 tons valued at \$4,731,521. Over one half the tonnage made in 1919 was speigeleisen made by the Algoma Steel Corporation for the Company's own use.

The exports of pig-iron during 1919 were 63,605 tons valued at \$1,820,260, or an average of \$28.62 per ton and of ferro-alloys 22,449 tons valued at \$1,229,341, or an average of \$54.76 per ton. The exports of pig-iron included 57,845 tons to the United States; 783 tons to Chili; 7 tons to Japan, and 4,970 tons to other countries. The ferro-alloy exports included 2,564 tons to United Kingdom; 15,371 tons to United States; 4,514 tons to other countries.

The imports during 1919 included 35,800 tons of pig-iron valued at \$1,022,871, or an average of \$28.80 per ton, and 16,221 tons of ferro-alloys, valued at \$901,678, or an average of \$55.58 per ton, making a total import of pig-iron and ferro-alloys of 52,021 tons valued at \$1,924,549. The United States trade records show exports to Canada during 1919 of pig-iron and ferro-alloys amounting to 33,751 gross tons (37,801 short tons), valued at \$1,052,103.

STEEL.

The total production of steel ingots and direct steel castings in 1919 subject to possible slight revision, was 1,031,929 short tons (920,844 long tons) of which 994,349 tons were ingots and 36,980 tons direct steel castings.

The total production in 1918 was 1,873,708 short tons (1,672,946 long tons) of which 1,800,171 tons were ingots and 73,537 tons were castings.

The 1919 production included: open-hearth steel 1,008,540 tons; electric steel 15,467 tons; crucible and converter steels 7,322 tons. The 1918 production included: open-hearth steel 1,746,334 tons; electric steel 119,130 tons; crucible and converter steels 8,244 tons.

The total production of electric furnace steel in 1917 was 50,467 tons and in 1916, 19,639 tons.

The total production of pig-iron, ferro-alloy and steel in electric furnaces was about 43,540 tons in 1919 as compared with 191,869 tons in 1918 and 101,031 tons in 1917.

The exports of steel during 1919, as per Customs Department records included billets, blooms and ingots 28,087 tons valued at \$1,731,529, or an average of \$61.65 per ton; bars and rods 52,191 tons valued at \$3,394,894, or an average of \$65.05 per ton; steel rails 30,737 tons valued at \$1,297,836, or an

average of \$42.22 per ton; wire and wire nails valued at \$5,745,773; structural steel 5,515 tons valued at \$465,989, or an average of \$84.49 per ton; scrap iron and steel 245,214 tons valued at \$3,779,179, or an average of \$15.41 per ton, together with a large quantity of manufactured iron and steel goods.

The production of rolled iron and steel products in 1919 included: steel rails 316,304 short tons; plates and sheets 25,408 short tons; wire rods 153,723 short tons and structural shapes 29,295 short tons, and a large tonnage of iron and steel bars, rods, etc., for which returns are not yet complete. The total production in 1919 of finished rolled products was 1,146,610 short tons, which included steel rails 162,747 tons; wire rods 154,789 tons; merchant bars and rods and structural shapes 415,017 tons; plates and sheets 26,413 tons; rolled blooms and billets for forging purposes and rolled blooms, billets, or slabs sold for export 395,644 tons.

ARSENIC.

The Canadian production includes arsenious oxide refined and crude produced in the smelting of the arsenical silver-cobalt-nickel ores of the Cobalt district, in addition to which arsenic has been recovered at Tacoma, Wash., from the arsenical gold concentrates shipped from the Hedley gold mine at Hedley, B.C.

The total production in 1919 was 2,662 tons of arsenious oxide and approximately 530 tons of arsenic in concentrates having a total valuation of \$508,770.

The production in 1918 was 2,482 tons of arsenious oxide and 1,078 tons of arsenic in concentrates having a total value of \$563,639.

The exports of arsenic in 1919 were 2,484 tons valued at \$351,912 as against exports of 2,672 tons in 1918. The imports of arsenious oxide in 1919 were 4,706 pounds valued at \$1,325 as against 995 pounds valued at \$222 in 1918; sulphide of arsenic 304,694 valued at 26,513, as against 301,985 pounds valued at \$33,351 in 1918; arsenate, bi-arsenate and stannate of soda 5,566 pounds valued at \$1,661; as against 121 pounds valued at \$34 in 1918.

ASBESTOS.

While most mining industries have been restricted during the past year, asbestos mining has been characterized by continued and increased activities.

As usual the production has all been derived from the Eastern Townships in the province of Quebec, principally from Black Lake, Thetford, Robertsonville, Coleraine, East Broughton and Danville.

The total output of crude and milled fibre during 1919 was 153,069 short tons as compared with 143,456 tons in 1918, an increase of nearly 10,000 tons.

The actual sales of asbestos were about 3,294 tons less in 1919 but at considerably higher prices. The total sales of crude were 3,817 tons at an average price of \$840.18 per ton as against sales in 1918 of 3,692 tons at an average of \$671.28 per ton. The total sales of mill stock in 1919 were 132,382 tons at an average value of \$56.29 as against total sales in 1918 of 137,770 tons at an average of \$46.88 per ton.

The average number of men employed in mining was 2,036 and in milling 1,458 or a total of 3,494 and total wages paid were \$3,882,092. In 1918 the total number of men employed was 3,074 including 1,674 in mines and 1,400 in mills and wages paid were \$2,871,643.

The total rock mined and quarried in 1919 was 3,014,458 and the rock milled 2,612,662 tons. There was thus a recovery of 101 pounds of asbestos per ton of

rock mined, and a mill recovery of 5.7 per cent of the rock milled as asbestos fibre. In 1918 the total asbestos recovery was about 116.5 pounds per ton of rock mined and the mill recovery of asbestos fibre 6.4 per cent of the rock milled.

Output, Sales, and Stocks of Asbestos.

	Output.	Sales.			Sales on hand December 31.		
	Tons.	Tons.	Value.	Per ton.	Tons.	Value.	Per ton.
1919.			\$	\$		\$	\$
Crude.....	4,054	3,817	3,206,952	840 18	1,303	948,008	727 56
Mill stock.....	149,015	132,382	7,451,994	56 29	30,558	1,930,534	63 11
	153,069	136,199	10,658,946	78 26	31,861	2,878,542	90 35
Asbestic.....		18,766	54,087	2 88			
Total.....		154,965	10,713,033	69 13			
1918.							
Crude.....	4,313	3,692	2,478,363	671 28	1,686	1,109,402	658 00
Mill stock.....	139,143	137,770	6,458,441	46 88	12,560	941,612	74 97
	143,456	141,462	8,936,804	63 17	14,246	2,051,014	143 97
Asbestic.....		16,797	33,903	2 02			
Total.....		158,259	8,970,707	56 68			

Exports of asbestos during 1919 were 119,122 tons valued at \$9,625,695, or an average of \$80.39 per ton and of asbestic sand and waste 25,306 tons valued at \$260,775, or an average of \$10.31 per ton. There was also an export of manufactures of asbestos valued at \$232,501. The destinations of asbestos exports were: United States 95,176 valued at \$7,232,744; France, 2,932 tons valued at \$413,580; Italy, 1,529 tons valued at \$245,210; and other countries, 8,985 tons valued at \$791,365.

The exports in 1918 were: Asbestos 119,454 tons, valued at \$7,786,710, or an average of \$65.19 per ton; asbestic sand and waste 22,144 tons valued at \$228,059, or an average of \$12.99 per ton; and manufactures of asbestos valued at \$40,763.

The imports of asbestos and manufactures of asbestos in 1919 were valued at \$656,937, as against imports in 1918 valued at \$604,703.

CHROMITE.

Notwithstanding the slump in demand and in price the shipments of chrome ore from the Eastern Townships of the Province of Quebec were almost one half those of the previous year. Production was altogether from the Black Lake and Richmond districts, no shipments having been reported from British Columbia. The total shipments of ores and concentrates by four firms were 8,366 short tons valued at \$224,971 which included 3,229 tons of ore averaging about 40 per cent Cr_2O_3 valued at \$66,837 and 5,137 tons of concentrates averaging about 49.8 per cent Cr_2O_3 valued at \$158,134. The total Cr_2O_3 content was about 3,860 tons. Returns from one other shipper when received will slightly increase this record. All of the shipments with the exception of 224 tons of crude and 2 tons of concentrates were for export to the United States.

The 1918 shipments were 21,994 short tons of ore and concentrates valued at \$867,122 having a total of Cr_2O_3 content of 8,526 tons and included crude ore 15,605 tons valued at \$456,408 averaging 34.5 per cent Cr_2O_3 and concentrates 6,389 tons valued at \$410,714 and averaging 49.15 per cent Cr_2O_3 . The crude

ore shipped included 1,850 tons sold for reconsumption in Canada and 13,755 tons sold for export—all the concentrates with the exception of about 2 tons were sold for export.

The exports of chromite in 1919 according to trade reports were 9,078 tons valued at \$198,733, or an average of \$21.89 per ton as compared with exports in 1918 of 15,831 tons valued at \$356,616, or an average of \$22.32 per ton.

There has been no recent production of ferro-chrome in Canada. Some small quantities have been imported of which there is no separate record. The imports of bichromate of soda in 1918 were 1,003,836 pounds valued at \$113,478 and the imports of bichromate of potash 58,072 pounds valued at \$19,525.

COAL.

Early estimates of the coal production during 1919 made in December underestimated the production during the last two months of the year. In the Province of Alberta there had been practically no production of bituminous coal during June and July and a very small production only of lignite. These operations were but slowly resumed late in August but during October, November and December, the production in this province exceeded the highest monthly rate previously reached.

The total production of marketable coal during 1919 (comprising sales, colliery consumption and coal used in making coke, or used otherwise by colliery operators) was 13,586,300 short tons valued at \$5,051,720, or an average of \$3.98 per ton and was with the exception of 1915 the lowest tonnage production recorded since 1911. The total value, however, on account of higher prices was but little less than that of the previous year which had been the highest recorded.

The total production in 1918 was 14,977,926 tons valued at \$55,192,896 compared with which the 1919 production shows a decrease of 1,391,626 tons, or 9.3 per cent, and \$1,141,176, or 2 per cent in value.

The total output of coal including waste and unmarketable slack in 1919 was 14,041,655 tons as against 15,460,385 tons in 1918.

The 1919 production included 73,893 tons of anthracite, all from one mine in Alberta, 10,629,697 tons of bituminous coal, and 2,882,710 tons of lignite.

The production in 1918 included 115,405 tons of anthracite; 11,636,190 tons of bituminous and 3,226,331 tons of lignite.

In Saskatchewan only has an increased production been shown in 1919. The largest decrease in tonnage was in Alberta but the heaviest percentage decrease was in New Brunswick.

The Nova Scotia production fell off by 116,246 tons or less than 2 per cent and has been exceeded in twelve out of the thirteen preceding years.

New Brunswick decreased by 90,236 tons, or 33.6 per cent though the 1919 production has been exceeded in the two preceding years only. Saskatchewan's production increased by 35,120 tons or 10 per cent and was the highest that has been reached in this province. Although Alberta fell off 1,079,086 tons, or 18 per cent the production was notwithstanding, higher than that of any previous year with the exception of 1918. The production during December 1919 in this province was 742,482 tons including 458,223 tons of lignite and 284,259 tons of bituminous and anthracite.

British Columbia's production was less by 139,378 tons, or 5.4 per cent and has been exceeded seven times in the past ten years.

Output¹ and Production² of Coal, 1918 and 1919.

(In short tons.)

	1918.				1919.			
	Output.	Production.	Value of production.	Ave. per ton.	Output.	Production.	Value of production.	Ave. per ton.
			\$	\$			\$	\$
Nova Scotia.....	5,836,370	5,818,562	21,095,470	3.63	5,785,929	5,702,316	21,920,047	3.84
New Brunswick....	266,585	268,312	1,331,710	4.97	177,307	177,976	792,876	4.46
Saskatchewan.....	348,988	346,847	722,148	2.08	382,649	381,967	834,358	2.18
Alberta.....	6,426,443	5,972,816	20,537,287	3.44	4,990,726	4,983,730	18,184,429	3.72
British Columbia..	2,879,069	2,568,589	11,404,681	4.47	2,703,845	2,429,211	12,315,610	5.07
Yukon Territory...	2,900	2,900	11,600	4.00	1,200	1,100	4,400	4.00
Total.....	15,460,385	14,977,926	55,192,896	3.68	14,041,655	13,586,300	54,051,720	3.98

¹Output includes waste and unmarketable slack. ²Production includes sales, colliery consumption, and coal consumed by operators in making coke, or for other uses.

The exports of coal in 1919 were 2,070,050 tons valued at \$12,438,885, or an average of \$6 per ton, as against exports in 1918 of 1,817,195 tons valued at \$9,405,423, or an average of \$5.17 per ton, showing an increase of 252,855 tons, or 13.9 per cent in quantity.

The total imports of coal of all classes in 1919, "Entered for consumption" as recorded by the Department of Customs, were 17,308,837 tons valued at \$61,160,799, as against imports in 1918 of 21,678,587 tons valued at \$71,650,584. The record shows a slight increase in the imports of anthracite coal but a decrease in the imports of bituminous coal.

Imports of Coal.

	1918.			1919.		
	Tons.	Value.	Ave.	Tons.	Value.	Ave.
		\$	\$		\$	\$
Bituminous, round and run of mine.....	13,656,360	37,291,057	2.73	10,127,965	24,750,717	2.44
Bituminous slack.....	3,237,067	8,351,639	2.58	2,228,197	4,814,388	2.16
Anthracite coal and dust.....	4,785,160	26,007,888	5.44	4,952,675	31,595,694	6.38
Total.....	21,678,587	71,650,584	3.30	17,308,837	61,160,799	3.53

The estimated consumption of coal based on production, exports and coal imported as "Entered for consumption" amounted in 1919 to 23,768,099 tons as compared with a corresponding consumption in 1918 of 34,771,832 tons.

The 1919 consumption included approximately 5,026,568 tons of anthracite; 20,858,821 tons of bituminous and 2,882,710 tons of lignite.

The 1918 consumption included 4,900,565 tons of anthracite; 26,544,936 tons of bituminous and 3,226,331 tons of lignite.

Coke.—The total output of oven coke during 1919 was 1,160,470 short tons made from 1,880,541 tons of coal of which 854,835 tons were of domestic origin and 1,025,706 tons imported. The output thus averaged 0.617 tons of coke per ton of coal charged. The total coke used or sold by producers during the year was 1,133,680 tons (941,111 tons used by the producers and 192,569 tons sold) valued at \$9,775,748 (partly estimated), or an average of \$8.62 per ton. Of the total output 1,036,229 tons, or 89.3 per cent was by-product oven coke and 124,241 tons beehive coke.

In 1918 the total output was 1,258,284 short tons made from 1,983,242 tons of coal of which 1,348,232 tons were of domestic origin and 635,010 tons imported, the output averaging 0.634 tons of coke per ton of coal charged. The coke used or sold by producers during the year was 1,250,744 tons valued at \$11,035,195 or an average of \$8.82 per ton. Of the total output 879,066, or 70 per cent was by-product coke and 379,218 tons beehive coke.

By provinces the production was: Nova Scotia 580,433 tons; a decrease of 197,180 tons; Ontario 649,506 tons, an increase of 224,419 tons due to the operation of the new ovens at Hamilton; British Columbia 100,356 tons, a decrease of 112,214 tons; no ovens were operated in Alberta though a few hundred tons were sold from stock pile.

The ovens operated during the year were those at Sydney and North Sydney, N.S., Hamilton and Sault Ste. Marie, Ont., Fernie, Michel, Union Bay and Anyox, B.C.

At the close of the year 587 ovens were in operation and 2,209 were idle. There were completed during the year 60 Koppers ovens at Sydney; 25 Williputte ovens at Sault Ste. Marie, and 30 Lomax regenerative ovens at Anyox, B.C. Of the total number of ovens 2,796 listed as operating and idle, 1,010 were of the by-product type and 1,786 Beehive, Bauer and Bernard.

The exports of coke in 1919 were 14,809 tons valued at \$129,703, or an average of \$8.75 per ton, as against exports in 1918 of 29,612 tons valued at \$223,629, or an average of \$7.55 per ton. The imports of coke in 1919 were 383,374 tons valued at \$2,405,740 or an average of \$6.27 per ton as against imports in 1918 of 1,165,590 tons valued at \$8,975,445, or an average of \$7.70 per ton.

The estimated consumption of oven coke in 1919 was 1,502,245 tons as compared with 2,386,722 tons in 1918 and 2,192,373 tons in 1917.

The recovery of by-products at Sydney, N.S., Hamilton, Sault Ste. Marie, Ont., and Anyox B.C., included: Sulphate of ammonia 11,765 short tons and tar 12,394,249 gallons as compared with 10,825 tons of sulphate of ammonia and 8,009,327 gallons of tar in 1918. The quantity of gas recovered in 1919 was 9,340 million cubic feet, or equivalent to over one third the total production of natural gas in Canada.

FLUORSPAR.

The production of fluorspar which grew from nothing in 1915 to 7,362 tons valued at \$156,029 in 1918 was reduced in 1919 to 5,063 tons valued at \$97,837. The Madoc district in Ontario has been the principal source of production though in 1919 the "Rock Candy" Mines in British Columbia contributed over 32 per cent of the shipments. The latter mine is situated near Grand Forks, B.C. and the first shipments were made in 1918.

Canadian steel companies use from 10,000 tons to 15,000 tons per annum. This consumption is, however, at present all in Eastern Canada and the British Columbia production in excess of the requirements at the Trail electrolytic lead refinery is finding an export market.

GRAPHITE.

Shipments of graphite from Canadian mines and mills reached a maximum in 1917 with a total of 3,714 tons valued at \$402,892. The shipments in 1919 have been reduced to 1,322 tons valued at \$92,837 almost all from Ontario.

The exports of graphite crude and refined are reported as 1,003 tons valued at \$72,917 and manufactures of graphite valued at \$23,970.

The imports of graphite during 1919 included: plumbago not ground valued at \$6,604; ground and manufactures of, valued at \$80,970 and crucibles, clay and plumbago valued at \$59,914. The imports in 1918 included plumbago not ground valued at \$93,956; ground and manufactures \$132,821; crucibles, clay or plumbago \$340,633.

GYPSUM.

Because of the general cessation of building activities during the war, the production of gypsum had fallen in 1918 to less than one-quarter the tonnage mined in 1913. The resumption of constructional activity during 1919, however, has resulted in almost doubling the 1918 production during the year just closed. The total quantity of gypsum rock quarried in 1919 was 304,532 tons of which 121,499 tons were calcined. The shipments of all grades totalled 306,947 tons valued at \$1,217,345 and included: lump gypsum 180,553 tons valued at \$208,916; crushed 27,939 tons valued at \$68,002; fine ground 3,955 tons valued at \$18,901, and calcined 94,501 tons, valued at \$921,526. By provinces the shipments were: Nova Scotia 171,623 tons valued at \$252,232; New Brunswick, 42,522 tons, valued at \$315,656; Ontario, 9,899 tons, valued at \$278,120; Manitoba, 32,903 tons, valued at \$371,337.

In 1918 the quantity quarried was 155,298 tons of which 88,748 tons were calcined. The shipments included: lump, 43,728 tons valued at \$47,727; crushed, 5,074 tons valued at \$55,079; fine ground, 4,558 tons valued at \$12,621; calcined, 78,927 tons valued at \$707,579, or a total of 152,287 tons valued at \$823,006.

The average number of men employed in 1919 was 342 and wages paid \$440,676, as compared with 435 men employed and \$275,312 paid in wages in 1918.

The exports of crude gypsum were: 148,394 tons valued at \$199,857, gypsum ground, plaster of paris, etc., valued at \$140,235. The corresponding exports in 1918 were: crude gypsum, 67,824 tons valued at \$80,843, and gypsum ground, etc., valued at \$101,618.

The imports of gypsum of all grades during 1919 were: 2,848 tons, \$47,455, and included: crude gypsum, 1,238 tons valued at \$22,556, gypsum ground, etc., 85 tons valued at \$2,695, and plaster of paris, 1,525 tons valued at \$22,204. The imports in 1918 totalled 1,286 tons valued at \$22,065.

MAGNESITE.

Magnesite is another of the mineral products the production of which from deposits in Argenteuil county, Quebec, was greatly increased during the war. The mineral is shipped in three forms, viz: as crude, calcined and dead burned, the calcining being done in kilns at the quarries and the clinkering in cement plants at Montreal and Hull, Que.

The total shipments in 1919 were 11,273 tons valued at \$328,465 less than one-third the shipments in 1918 which were 39,365 tons valued at \$1,016,765. The 1919 shipments included 1,638 tons of crude valued at \$14,664 and 9,635 tons of calcined and clinkered valued at \$313,801. In 1918 the shipments included, crude 16,697 tons valued at \$158,380, calcined and clinkered 22,668 tons valued at \$858,385.

Exports of magnesite in 1919 were valued at \$232,377 as compared with a value of \$816,443 in 1918.

PETROLEUM.

Over 90 per cent of the production of crude petroleum in Canada is still obtained from the old oil fields in southern Ontario, which have now been producing for 58 years. This production has been supplemented during recent years, by a small annual production from New Brunswick and Alberta. The total production of crude oil from these fields in 1919 was 240,970 barrels of 35 imp. gallons, having a value of \$744,677, as compared with a total production in 1918 of 304,741 barrels, valued at \$885,143.

A bounty of $1\frac{1}{2}$ cents per gallon is paid on the marketed production of crude petroleum from oil fields in Canada, the administration of the "Petroleum Bounty Act" being under the Department of Trade and Commerce. According to returns of bounty payments, the production in the province of Ontario was 219,804 barrels (7,693,141 imp. gallons) which at the average price per barrel of \$2.87 $\frac{1}{2}$, was worth \$631,937. The New Brunswick production, according to bounty payments was 4,275 barrels valued at \$13,295—or an average value of \$3.11.

During the past six years there has been a small but growing production of crude petroleum in Alberta, the recorded production being all from the Turner Valley field, near Black Diamond, about 35 miles south of Calgary. A large portion of the oil production from this source is a very light oil, and on that account not entitled to bounty payment. The approximate production in 1919 was 16,891 barrels valued at \$99,445.

The 1918 production of crude oil included 3,009 barrels valued at \$7,402 from New Brunswick; 288,692 barrels valued at \$777,737 from Ontario, and 13,040 barrels valued at \$100,004 from Alberta.

The price per barrel of crude oil at Petrolia, was quoted at \$2.78, from July 19, 1915, to September 8, 1919, when the price was increased 10 cents to \$2.88. On November 24, 1919, the price was again increased by 25 cents to \$3.13, and on December 22, a further increase of 25 cents went into force making the price from that date to the end of the year \$3.38. The average price for the year based upon monthly settlements, is reported by the Supervisor of Crude Petroleum Bounties as \$2.87 $\frac{1}{2}$. The average monthly price in 1918 was \$2.69 $\frac{1}{2}$, as against an average of \$2.33 $\frac{1}{2}$ in 1917, \$1.98 in 1916 and \$1.39 $\frac{1}{2}$ in 1915.

The production, in barrels, at the various fields in the Province of Ontario as kindly furnished by the Supervisor of Petroleum Bounties at Petrolia, was as follows, viz:—Petrolia and Enniskillen 70,087; Oil Springs 45,245; Moore township, 4,029; Sarnia township, 4,259; Plympton township, 560; Bothwell 29,425; Tilbury 18,365; Dutton 1,272; Onondaga 197; Moza township 45,860; Thamesville 801.

The production by Districts in 1918, in barrels was: Petrolia and Enniskillen 65,467; Oil Springs 44,671; Moore township, 6,367; Sarnia township, 3,438; Plympton township, 412; Bothwell 29,116; Tilbury 25,228; Dutton 1,875; Onondaga 1,186; Belle River 447; Moza township, 108,988; Thamesville 1,566.

The production in Moza township, which had increased from 20,998 barrels in 1917 to over 108,000 barrels in 1918, decreased again during the past year to 45,860 barrels. On the other hand the production of the old fields at Petrolia and Oil Springs, both show a substantial increase of production in 1919 over the 1918 output.

Complete returns of the production of oil refineries have not yet been received, but according to inspection returns of the Inland Revenue Department of the Customs Department, the total quantity of illuminating oils inspected during the calendar year 1919, was 62,480,214 gallons, and the quantity of naphtha, or gasoline and other light oils was 97,519,950 gallons, or a total of oils inspected 161,000,164 gallons.

In 1918, ten oil refineries in Canada used 262,641,155 gallons of crude oil of which 250,382,965 gallons were imported, and 12,258,190 gallons were obtained from Canadian wells. The production of refined oils and petroleum products included gasoline and motor oils 72,175,768 gallons; benzoline, benzene, and other light oils, 1,530,592 gallons; illuminating oils 65,268,598 gallons; lubricating oils 14,402,523 gallons; gas and fuel oils and tar 79,092,347 gallons; wax and candles 13, 759,972 pounds. There was also a production of asphalt and other products. The total value of the products of refineries was \$37,287,891.

According to inspection returns of the Inland Revenue Department the total quantity of illuminating oils inspected during the calendar year 1918 was 55,443,056 gallons and the quantity of naphtha or gasoline and other light oils was 74,310,352 gallons.

Exports of petroleum entered as crude mineral oil in 1919 were 603,748 gallons valued at \$40,648, and of refined oil 2,846,293 gallons valued at \$287,170. There was also an export of naphtha and gasoline of 1,566,707 gallons valued at \$428,754, and an export of mineral wax amounting to 7,125,900 pounds valued at \$626,799. The exports in 1918 were: Crude oil 270,302 gallons valued at \$28,415 and of refined oil 1,946,967 gallons valued at \$206,675; naphtha and gasoline 91,229 gallons valued at \$28,778.

The total value of the imports of petroleum and petroleum products in 1919 was \$29,519,196 as against a value of \$30,649,570 in 1918, and a value of \$22,957,688 in 1917.

The total quantity of petroleum oils, crude and refined, imported in 1919, was 451,211,270 gallons, as compared with 420,728,933 gallons in 1918. A detailed record of the various classes of imports will be found in the accompanying tables.

Imports of Petroleum and Petroleum Products during the Calendar Years 1918 and 1919.

	1918.		1919.	
	Gal.	Value. \$	Gal.	Value. \$
(a) (1) Crude petroleum in its natural state -7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refineries to be refined in their own factories.....	229,010,561	13,359,636	305,748,960	15,104,287
(2) Petroleum (not including crude petroleum imported to be refined, or illuminating or lubricating oils) -8235 specific gravity or heavier at 60 degrees temperature.....	148,537,043	8,255,387	99,559,068	4,702,771
(b) Crude petroleum, gas oils (other than benzine, naphtha and gasoline).....	65,845	7,584	155,145	23,866
(c) Coal and kerosene, distilled, purified, or refined.....	5,241,881	526,606	6,757,159	926,822
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon.....	205,839	152,825	105,750	77,938
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon.....	2,450,588	476,641	1,496,809	289,442
(f) Products of petroleum, n.o.p.....	29,246,143	5,595,425	29,516,589	5,615,622
(g) Lubricating oils, n.o.p.....	2,849,051	1,203,130	3,480,183	1,467,593
(h) Gasolene.....	3,121,982	798,387	4,391,607	1,142,855
Total.....	420,728,933	30,375,621	451,211,270	29,351,196
Paraffin wax.....	1,755,422	209,916	844,838	108,849
Paraffin wax candles.....	327,657	64,033	297,419	59,151
		30,649,570		29,519,196

PYRITES.

The shipments of pyrites as sulphur ore from Canadian mines were less than half those of the previous year. The total shipments in 1919 were 177,487 tons valued at \$522,704 and included 52,746 tons from Quebec; 117, 011 tons from Ontario, and 7,730 tons from British Columbia. The total sulphur content of shipments was 65,674 net tons, or an average of 37 per cent. Of the total shipments 46,233 tons were sold for consumption in Canada and 131,254 tons for consumption in the United States.

In 1918 the total shipments were 411,616 tons valued at \$1,705,219 and included 124,871 tons from Quebec; 268,507 tons from Ontario, and 18,238 tons from British Columbia. The total sulphur content was 154,269 tons or an average of 37.5 per cent. Of the total shipments 83,868 tons were sold for consumption in Canada and 327,748 tons for consumption in the United States.

Custom records show exports of pyrites during 1919 as 89,080 tons valued at \$388,508 as against exports in 1918 of 240,453 tons valued at \$949,067. These figures are considerably under those reported directly by the operators as being for export.

Exports of sulphuric acid during 1919 were 10,894,200 pounds valued at \$108,392 as against 11,199,200 pounds valued at \$165,579 exported in 1918.

Imports of brimstone, or crude sulphur, in 1919 were 56,062 tons valued at \$1,015,223, as compared with 97,062 tons valued at \$2,058,811 imported in 1918. Imports of sulphuric acid in 1919 were 1,437 tons valued at \$38,759 as against imports of 5,954 tons valued at \$208,288 in 1918.

SALT.

The production of salt in Canada continues to increase with fair regularity. The total sales in 1919 from domestic sources including the salt equivalent to brine for chemical manufacturing, were 148,302 tons valued at \$1,398,968 as against sales in 1918 of 131,727 tons valued at \$1,285,039. These values as far as possible exclude the value of packages. The value of packages was in 1919 \$674,945 as compared with \$574,033 in 1918. By grades the production in 1919 included table and dairy 34,396 tons, common fine 47,571 tons; common coarse 64,601 tons; land salt 1,734 tons. The production by grades in 1918 was; table and dairy 34,324 tons; common fine 54,210 tons; common coarse 41,152 tons; land salt 2,041 tons.

The number of men employed in 1919 was 304 and wages paid \$324,325. In 1918 the average number of men employed was 302 and wages paid \$286,781.

As usual the Canadian production was obtained almost entirely from the salt field in southern Ontario. Some years ago there was a small production from brines at Sussex, N.B., and at Lake Winnipegosis in Manitoba. During 1919 there was an experimental production of salt from brines flowing from springs in the Province of Saskatchewan, near Senlac. A small quantity of salt was obtained by solar evaporation, and disposed of to the farmers in the district. Development has continued on a deposit of rock salt near Malagash, Cumberland County, N.S., in the course of which over 175 tons of salt have been taken out and shipped. This deposit has attracted considerable attention during the past year through the discovery of potash minerals associated with the salt.

Exports of salt in 1919 were 617 tons valued at \$14,573. The imports of salt were 146,916 tons valued at \$1,310,139 and included 51,441 tons of fine salt in bulk, valued at \$289,119; 33,173 tons of salt in packages valued at \$467,591, and 62,292 tons of salt imported from Great Britain for the use of fisheries valued at \$555,439.

The exports of salt in 1918 were, 893 tons valued at \$16,743 and the total imports were 165,494 tons valued at \$1,267,169.

The calculated consumption of salt in 1919 was 296,426 tons valued at \$2,692,207 as compared with a consumption in 1918 of 296,328 tons valued at \$2,535,465. (The value of the imported salt being that at point of origin).

Caustic soda and chloride of lime are manufactured by the Canadian Salt Company at their chemical works at Sandwich, Ont. Brunner, Mond, Canada, Ltd., has completed and placed in operation at Amherstburg, Ont., a chemical plant for the manufacture of soda ash from brine.

The imports of salt cake (sodium sulphate) in 1919 were: 23,952 tons valued at \$343,007; soda ash (sodium carbonate) 31,319 tons valued at \$1,305,348; caustic soda 3,494 tons valued at \$282,368; sal soda 5,439 tons valued at \$164,259 and chloride of lime 8,909 tons valued at \$304,691.

STRUCTURAL MATERIALS.

During the war building activity was reduced to a minimum and the total value of the production of cement, clay and quarry products which had reached a maximum of \$30,809,752 in 1913 had fallen to \$17,467,186 in 1916 increasing slightly to 19,130,799 in 1918.

In 1919 the value of this production had increased to over \$25,750,000. While higher prices have played an important part in this increase of over 25 per cent in value the actual quantities of cement, bricks, lime and stone produced has been considerably increased in 1919 over the 1918 production.

Cement.—Production by one firm has not yet been received but has been estimated. Subject to slight revision on this account the total quantity of cement sold from Canadian cement mills in 1919 was 4,991,340 barrels valued at \$9,783,393, or an average of \$1.96 per barrel as compared with sales in 1918 of 3,591,481 barrels valued at \$7,076,503, or an average of \$1.97 per barrel showing an increase in quantity of 1,399,859 barrels or 39 per cent and an increase in total value of \$2,706,890, or 38.3 per cent.

The total quantity of cement made in 1919 was 4,000,738 barrels as compared with 3,417,660 barrels made in 1918, an increase of 1,183,078 barrels or 34.6 per cent.

Stocks of cement on hand January 1, 1919 were 1,480,565 and at the end of December this had been reduced to 1,084,764 barrels.

The exports of cement in 1919 were valued at \$465,954 as against exports in 1918 valued at \$13,752. For the first time the value of cement exports has greatly exceeded the imports. The quantity is not reported but assuming a price of \$2 per barrel the quantity would be estimated as 232,977 barrels.

The total imports of cement in 1919 were 49,232 cwt. equivalent to 14,066 barrels of 350 pounds each valued at \$51,314, or an average of \$3.65 per barrel as compared with imports of 5,913 barrels valued at \$19,851, or an average of \$3.36 per barrel in 1918.

The total consumption of cement in 1919 was therefore about 4,772,420 barrels as compared with a consumption of 3,597,394 barrels in 1918, an increase of 1,175,035 barrels, or 30 per cent.

Clay Products.—The total value of the production of brick, tile, pottery and other clay products is estimated for 1919 at \$7,657,938 as against a value of \$4,583,489 in 1918, an increase of \$3,074,449, or 67 per cent. The production of common and pressed brick was increased by nearly 50 per cent in quantity, that of sewerpipe by nearly 60 per cent in quantity.

Lime.—Sales estimated at 6,909,706 bushels valued at \$2,268,432, an increase of 10 per cent in quantity and over 20 per cent in total value.

Sand-Lime brick.—Sales reported as 28,219 M valued at \$377,040—nearly double the quantity and over double the total value in 1918.

Stone Quarries.—Value of production estimated at a little under \$4,000,000 as compared with \$3,036,574 in 1918.