

CANADA

DEPARTMENT OF MINES

Hon. SIR JAMES A. LOUGHEED, Minister.      CHARLES CAMSELL, Acting Deputy Minister

MINES BRANCH

JOHN McLEISH, Acting Director.

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PRELIMINARY REPORT

ON THE

MINERAL PRODUCTION OF  
CANADA

DURING THE CALENDAR YEAR  
1920

PREPARED BY

JOHN McLEISH, B.A.,

Chief of the Division of Mineral Resources and Statistics.

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1921

# PRELIMINARY REPORT

ON

## THE MINERAL PRODUCTION OF CANADA

### DURING THE CALENDAR YEAR 1920

The present preliminary report is, as usual, 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.

The tabulated statements of mineral production are 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. There has been a wide range in price of many metals and mineral products during the past six or seven years and the continuation of high prices for many products has 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. For instance, the average price of coal at the mine has increased from \$2.49 in 1913 to \$4.65 in 1920, so that the same tonnage of coal as was produced in 1913, viz. 15,012,178 tons would have a value in 1920 greater by over \$32,000,000 than was placed upon it in 1913.

Estimates of the total probable value of the mineral production of Canada during 1920 made on the first of January last, were short about 8 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, had responded more extensively, and at higher values than had been estimated, to the heavy demand for fuel.

The total estimated value<sup>1</sup> of the metal and mineral production in 1920 was \$217,775,080 which is greater than the total value reached during any preceding year. Compared with the production in 1919 valued at \$176,686,390 an increase of \$41,088,690 or 23.3 per cent is shown, while compared with 1918 the previous maximum year the increase was \$6,473,183 or 3 per cent.

The evidence toward the close of the year of economic depression, falling prices, restriction or complete cessation of operation at numerous points tended to monopolize the public mind, and to divert attention from the fact that Canada's mining industry during 1920, had furnished an output, the value of which, was greater than had been attained in any previous year.

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<sup>1</sup> 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 of Canada 1920.

(Subject to Revision:)

	Quantity	Value
<b>METALLIC</b>		
		\$
Cobalt, metallic and contained in oxide, etc., at \$2.50 per lb.	Lbs. 593,920	1,484,800
Copper, value at 17.456 cents per lb.	" 81,155,360	14,186,479
Gold, at \$20.671834	Ozs. 766,912	15,853,478
Iron, pig, from Canadian ore	*Tons 75,869	2,066,997
Iron ore, sold for export	" 7,855	58,476
Lead, value at 8.940 cents per lb.	Lbs. 33,985,974	3,038,346
Nickel, value at 40 cents per lb.	" 61,136,493	24,454,597
Platinum from alluvial sands	Ozs. 47	704
Platinum, palladium, etc., from Sudbury matte	" 1,922	122,661
Silver, value at 100.90 cents per oz.	" 12,793,541	12,908,683
Zinc, value at 7.671 cents per lb.	Lbs. 40,166,200	3,081,149
Total		77,236,370
<b>NON-METALLIC</b>		
Actinolite	Tons 100	1,160
Arsenic, white, and in ore	" 2,408	313,575
Asbestos	" 167,731	13,677,841
Asbestos	" 20,956	57,601
Barytes, Manganese and Talc	" 10,500	244,984
Chromite	" 16,623,598	77,326,853
Coal	" (a)	
Corundum	" 36,856	274,075
Feldspar	" 11,229	260,446
Graphite	" 2,227	173,537
Grindstones	" 2,319	78,136
Gypsum	" 429,144	1,876,595
Magnesite	" 18,378	512,756
Magnesium sulphate	" 1,855	30,648
Mica	" 2,150	368,297
Mineral water		24,109
Natural gas	M cu. ft. 16,961,284	4,225,887
Oxides	Tons 18,768	144,409
Peat	" 3,900	15,600
Petroleum, crude	Brls. 196,937	821,545
Pyrites	Tons 174,744	751,009
Quartz	" 127,995	466,621
Salt	" 210,211	1,547,879
Sodium sulphate	" 813	19,877
Tripolite	" 260	8,600
Total		102,353,862
<b>STRUCTURAL MATERIALS AND CLAY PRODUCTS</b>		
Cement, Portland, Puzzolan	Brls. 6,651,980	14,793,070
Clay Products (\$10,533,271)—		
Brick, common	M 315,110	4,868,958
Brick, pressed	M 81,776	1,756,760
Fireproofing	Tons 49,220	591,216
Hollow building blocks	M 284,163	
Kaolin	Tons 683	15,022
Moulded and ornamental; terra cotta		120,875
Pottery		207,410
Refractories, fire-clay, etc.		517,335
Sewerpipe	Tons 58,827	1,549,090
Tile, drain	M 16,061	619,442
Lime	Bus. 9,355,797	3,748,463
Sand-Lime brick	M 46,102	718,735
Sand and gravel (not complete)	Tons 6,588,037	3,208,660
Slate	Sq. 14,200	
Stone (\$5,163,449)—		
Granite		1,389,976
Limestone		3,404,906
Marble		240,353
Sandstone (b)		128,214
Total Structural Materials and Clay Products		38,184,848
All other Non-Metallic		102,353,862
Total value Metallic		77,236,370
Grand total, 1920		217,775,080

\* Short tons throughout.

(a) Railway shipments 195 tons.

(b) Additional returns of \$47,500.

## Increase or Decrease in Principal Products, 1920.

Principal Products		Increase (+) or Decrease (-) in Quantity		Increase (+) or Decrease (-) in Value	
			%	\$	%
Copper.....	Lbs.	+ 6,101,779	8.1	+ 38,214	0.3
Gold.....	Ozs.	+ 148		+ 3,055	
Pig-iron from Canadian ore.....	Tons	+ 37,412	97.3	+ 1,167,591	129.8
Lead.....	Lbs.	- 9,841,725	22.5	- 14,691	0.5
Nickel.....	"	+ 16,591,610	37.3	+ 6,636,644	37.3
Silver.....	Ozs.	- 3,227,116	20.1	- 4,893,791	27.5
Zinc.....	Lbs.	+ 7,971,493	24.8	+ 718,701	30.4
<b>Total metallic.....</b>				<b>+ 3,973,577</b>	<b>5.4</b>
Asbestos and Asbestic.....	Tons	+ 29,451	18.5	+ 2,760,073	25.1
Coal.....	"	+ 2,942,380	21.5	+ 22,913,504	42.1
Gypsum.....	"	+ 130,081	43.5	+ 661,308	54.4
Magnesite.....	"	+ 7,105	63.0	+ 184,291	56.1
Mica.....	"			+ 94,509	34.5
Natural gas.....	M cu. ft.	- 2,976,485	14.9	+ 49,850	1.2
Petroleum.....	Brls.	- 43,529	18.1	+ 85,221	11.6
Pyrites.....	Tons	+ 1,743		+ 228,305	43.7
Quartz.....	"	+ 33,004	34.7	- 61,014	11.6
Salt.....	"	+ 61,910	41.7	+ 149,950	10.7
Cement.....	Brls.	+ 1,656,723	33.2	+ 4,995,637	51.0
Clay products.....	"			+ 2,626,905	33.2
Lime.....	Bush.	+ 2,208,293	30.9	+ 1,437,856	62.2
Stone.....				+ 937,512	22.2
<b>Total non-metallic.....</b>				<b>+ 37,115,113</b>	<b>35.9</b>
<b>Grand total Increase.....</b>				<b>+ 41,088,690</b>	<b>23.3</b>

## Metal Prices.

(In cents per pound or ounce.)

	1915	1916	1917	1918	1919	1920
Antimony (ordinaries)..... Per pound.	30.280	25.370	20.690	12.581	8.190	8.490
Copper, New York.....	17.275	27.202	27.180	24.628	18.691	17.456
Lead, ".....	4.673	6.858	8.787	7.413	5.759	7.957
" London.....	4.979	6.715	6.626	6.270	6.211	8.219
" Montreal.....	5.600	8.513	11.137	9.250	6.966	8.940
Nickel, New York.....	45.000	45.000	50.000	46.250	45.000	45.000
Silver, "..... Per ounce.	49.684	65.061	81.417	96.772	111.122	100.900
Spelter, "..... Per pound.	13.230	12.804	8.901	8.159	7.338	.....
Spelter, St. Louis.....	13.054	12.634	8.730	7.890	6.988	7.671
Tin, New York.....	38.500	43.480	61.802	(a)88.750	63.328	48.273

\*Quotations furnished by Messrs. Thomas Robertson & Company, Montreal, Que. and in 1920 by the Consol. Mining & Smelting Co. of Canada, Ltd.

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

## Mineral Production by Provinces 1919 and 1920.

	1919		1920		Increase (+) or Decrease (-)	
	Value of Production	Per cent of total	Value of Production	Per cent of total		
	\$	%	\$	%	\$	%
Nova Scotia.....	23,445,215	13.27	30,187,533	13.86	+ 6,742,318	28.8
New Brunswick.....	1,770,945	1.00	2,225,261	1.02	+ 454,316	25.7
Quebec.....	21,267,947	12.04	27,722,502	12.73	+ 6,454,555	30.3
Ontario.....	67,917,998	38.44	78,749,178	36.16	+ 10,831,180	15.9
Manitoba.....	2,868,378	1.62	3,900,207	1.79	+ 1,031,829	36.9
Saskatchewan.....	1,521,964	0.86	1,711,580	0.79	+ 189,616	12.5
Alberta.....	21,087,582	11.94	33,721,898	15.49	+ 12,634,316	59.9
British Columbia.....	34,865,427	19.73	38,044,915	17.47	+ 3,179,488	9.1
Yukon.....	1,940,934	1.10	1,512,006	0.69	- 428,928	22.1
	176,686,390	100.00	217,775,080	100.00	+ 41,088,690	23.3

The metallic production which in 1918 was valued at \$114,549,152 and fell in 1919 to \$73,262,793 has increased in 1920 to \$77,236,370. The metallic production is still less in total value than that reached during each of the years 1916, 1917 and 1918.

The total value of the non-metallic production including clay and quarry products in 1918 was \$96,752,745 which was increased in 1919 to \$103,423,507 and has now again been increased in 1920 to \$140,538,710. Although about \$23,000,000 of this increase is due to coal alone about \$10,000,000 to the increased production of Cement, Clay and quarry products there is evidence of a remarkable growth and development in the exploitation of Canadian Non-metallic mineral resources.

The past year has shown a quick recovery in the production of copper, nickel, and zinc amongst the metals and in the production of coal and many other non-metallic products. Gold production has continued to increase during each of the past two years, though the increment has been very small, and Canada occupies an almost unique position in being perhaps the only gold producing country which has not shown a serious falling off in the production of this metal. In the production of zinc, asbestos and coal the highest pinnacle of production has been reached during the year just closed. True it is that some products such as graphite, magnesite and pyrites have apparently not been in strong demand, yet the production of these as well as of chromite, gypsum, fluorspar, mica and salt have not only been well maintained but have been materially increased while the production of feldspar has been more than doubled.

Shortage of fuel throughout the greater part of the year in Central Canada and insufficient transportation facilities have tended to restrict shipments. The production of lime and cement was seriously affected by the fuel shortage while car shortage restricted, or hampered the shipments of coal, asbestos, feldspar, and other products. In many camps labour was none too plentiful and wages for the most part were maintained at the highest levels.

It is probable that in the production of metals the recovery to higher output levels has been too rapid. With the exception of silver, metal prices were well maintained throughout the first nine months of the year, copper holding during this period at slightly above the average of the previous year, lead at about 50 per cent above the average of 1919 and zinc at 30 per cent in excess of the previous year's average.

Toward the end of the year, however, market conditions appeared to indicate the accumulation of excessive stocks, and the crash in metal prices during October, November and December showed the desire of holders to unload. The fall in silver prices began in January and was accelerated in October.

The severe price decline has resulted in the recent closing of a number of mining operations with the consequent labour unemployment involved. Some of these must perforce remain closed or work at part capacity until exhaustion of accumulated stocks restores the market demand, or higher prices, or until the operators are able to reduce costs of production to the point of successfully meeting prevailing prices.

It is not intended to discuss here the probable effect of the year end price decline and economic depression upon the mineral output during the coming year but the hope may be expressed that it will rapidly be followed by an industrial activity based upon more healthy conditions of price and profit. While Canada has her domestic problems in respect to supplies of iron and petroleum and distribution of coal, the great basic factors of her enormous mineralized areas, her great known resources in coal, nickel, copper, gold, zinc, asbestos, and other metals and products too numerous to specify and her infinitely greater latent possibilities should never be lost sight of. These will continue to form the basis of industry and of national development ever growing in extent and accelerated with increasing knowledge of better methods of recovery and use.

## COPPER

The production of copper in 1920 amounted to 81,155,360 pounds (40,577.7 tons), which at the average price in New York of 17.456 cents per pound would be worth \$14,166,479 as against 75,053,581 pounds (37,527 tons) valued at \$14,028,265, or an average of 18.691 cents per pound in 1919.

Of the total production 63,395,830 pounds, or 78.1 per cent were contained in blister copper and in nickel-copper matte produced in Canada, part of which was refined at Trail, B.C., at Port Colborne, Ont., and at Deschênes, Que., the balance being exported for refining; 44,766 pounds, or 0.05 per cent were contained in copper sulphate, and 17,714,764 pounds, or 21.8 per cent estimated as recovered from ores exported to United States smelters.

The total production of refined copper in 1920 was 2,620.2 tons, being the production at the electrolytic refinery of the Consolidated Mining & Smelting Company at Trail, B.C., and at the refinery of the British America Nickel Company's plant at Deschênes, Que. The production in 1919 was 3,467 tons of refined copper.

The production in Quebec was, as usual, from the pyritic ores of the eastern townships which are shipped primarily for their sulphur content, and amounted to 768,282 pounds, valued at \$134,111, as against 2,691,695 pounds valued at \$503,105 in 1919.

The production in Ontario amounted to 31,980,067 pounds valued at \$5,582,440, as against 24,346,623 pounds valued at \$4,550,627 in 1919. This production is derived from the treatment of the copper-nickel ores of the Sudbury district, 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 a little over three million pounds in 1920 as in 1919 and was shipped from the Mandy mine at Schist lake, north-west of The Pas. The Mandy Mining Company suspended operations towards the end of 1919 so that the ore shipped in 1920 had been mined during the previous year.

Most of the equipment at the Mandy mine was sold to a syndicate which was doing extensive development at the Flin Flon property, on Flin Flon lake in the same district.

The survey for a railroad from the Hudson Bay railway line has been undertaken so that in time this new district will be an important contributor to the Canadian production of copper.

The production from British Columbia was 45,344,434 pounds valued at \$7,913,324, as against 44,502,079 pounds, valued at \$8,317,884 in 1919. The production included 44,766 pounds as copper sulphate; 28,419,307 pounds as blister copper partly refined at Trail and partly exported for refining; and 16,880,361 pounds being the estimated recoveries from ores exported to American smelters.

We have no record of any production from the Yukon for the year 1920, whereas in 1919 the production was 165,134 pounds valued at \$30,874. This production as in past years has been derived from the copper mines of the Whitehorse district.

The exports from Canada in 1920 were: Copper fine, in ore, etc., 23,665 tons, valued at \$5,917,782; blister copper 19,099 tons, valued at \$8,701,184; copper in pigs, bars, sheets, etc., 1,332.2 tons, valued at \$710,978; and copper "old and scrap," 387.2 tons, valued at \$113,265, giving a total of 44,485 tons, valued at \$15,444,209, besides copper wire and cable valued at \$433,097. The total exports in 1919 were 41,058 tons valued at \$14,654,640.

The imports of copper in ingots, bars, etc., and in manufactured form in 1920 were valued at \$4,558,234, as against a reported value of \$3,599,297. The

quantity imported in 1920 would approximate 10,500 tons, as against 10,000 tons in 1919.

The price of copper, which was around 19 cents per pound in January, remained fairly steady above 18 cents until October, when it dropped to below 16 cents and gradually declined to 13 cents at the end of December, 1920.

## GOLD

The total production of gold in 1920 amounted to 766,912 fine ounces valued at \$15,853,478 as against 766,764 fine ounces valued at \$15,580,423 in 1919. Gold has been valued at the usual value of \$20.671834.

Of the total production 84,659 ounces, or 11.0 per cent, was produced from placer or alluvial mining; 582,852 ounces, or 76.0 per cent, was in the form of bullion; 44,982 ounces, or 5.9 per cent, was in blister copper and lead bullion, and 54,399 ounces, or 7.1 per cent, in residues and ores exported.

The production in Nova Scotia was only 690 ounces, as against 850 ounces in 1919. The production from this province has fallen off rapidly during the last few years.

The production in Quebec amounted to 955 ounces, as against 1,470 ounces, and as usual, is derived from the pyritic ores of the Eastern Townships and the zinc-lead ores of Notre Dame des Anges, Portneuf county.

The production in Ontario amounted to 564,959 ounces as compared with 505,739 ounces, being an increase of 11.7 per cent and by far the greatest production ever recorded. Ontario in 1920 produced 73.7 per cent of the total production of Canada as against 65.9 per cent in 1919.

The production from Manitoba was 781 ounces, as against 724 ounces in 1919, and was derived as in the past few years from the gold and copper ores of The Pas district, northern Manitoba.

The production from British Columbia amounted to 127,387 ounces as against 167,252 ounces in 1919, being a decrease of 23.8 per cent. The production for the last few years has been much below the usual production of from five to six million dollars per year—i.e., 220,000 to 298,000 ounces per year.

The production from the Yukon Territory was 72,140 ounces, as against 90,705 in 1919. This production is derived almost wholly from the alluvial sands with also a very small production from the gold ores of the Conrad district.

There has been a gradual falling off in production since 1913, when about six million dollars, or 283,000 ounces was reported.

The exports of mine gold bullion, gold-bearing dust, nuggets, gold in ore, etc., are recorded for 1920 as \$4,642,909, as against \$5,037,123 in 1919; \$10,040,813 in 1918, and \$15,929,051 in 1917. The apparent decrease is largely due to the prohibition of exports of gold and the purchase by the Ottawa Mint of most of the bullion formerly exported. The final disposal of the coining bullion is not included as a commercial export.

## Lead

The production of lead in 1920 amounted to 33,985,974 pounds (16,993 tons) valued at \$3,038,346 or an average of 8.940 cents per pound, as against 43,827,699 pounds (21,914 tons) valued at \$3,053,037, or an average of 6.966 cents per pound in 1919, showing a decrease of 21.9 per cent in quantity, and 0.5 per cent in value. The values are calculated on the average price of lead in Montreal.

The production includes 28, 985,590 pounds of refined lead and pig lead produced in Canada from the treatment of the Canadian ores, together with 5,000,384 pounds of lead being estimated as recovered from ores exported to the United States.

The lead ores exported were derived mostly from the mines of East and West Kootenay, B.C., supplemented by shipments from Notre Dame des Anges, Quebec.

The total shipments from the mines of lead ores and concentrates were about 66,956 tons containing approximately 33,802,270 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.

	1917	1918	1919	1920
	Lbs.	Lbs.	Lbs.	Lbs.
(1) Lead contents of ores and concentrates shipped from mines in Canada.....	38,696,116	46,843,602	32,147,989	33,802,270
(2) Production: Smelter recoveries from Canadian ores and recoverable lead in ore exported.....	32,576,281	51,398,002	43,827,699	33,985,974
(3) Total production of refined lead in Canada (including lead from imported ores).....	32,115,114	31,571,112	34,330,920	28,720,030

The exports of lead in 1920 were: Lead contained in ores, concentrates, etc., 7,549,400 pounds, valued at \$385,839 and pig-lead 18,800 pounds, valued at \$1,846. The exports in 1919 were: Lead in ores, etc., 13,142,900 pounds, valued at \$616,278, and pig-lead 11,326,800 pounds, valued at \$772,734.

The imports of lead in 1920 were valued at \$2,987,467 and contained approximately 16,000 tons of lead, as against a total value of \$1,022,265 and an approximate lead content of 7,044 tons in 1919.

The average price of lead in Montreal was 9.93 cents per pound in January and increased to a maximum of about 11 cents in March, then gradually declined to an average of 5.94 cents for December.

## NICKEL

The total production of nickel in 1920 amounted to 61,136,493 pounds, which at 40 cents per pound would be worth \$24,454,597, as against 44,544,883 pounds valued at \$17,817,953 in 1919.

The production as usual represents the nickel in the matte produced from the treatment of the ores of the Sudbury District 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.

Nickel-copper matte is produced at the smelters of the International Nickel Company of Canada; the Mond Nickel Company, and the British America Nickel Corporation and amounted in 1920 to 57,892 tons containing 30,459 tons of nickel and 15,957 tons of copper, the average percentage of the combined metals in the matte being about 80.0. The production in 1919 was 42,736 tons of Bessemer matte containing 22,035 tons of nickel and 12,099 tons of copper. There were mined in 1920 981,268 tons of ore and smelted 937,874 tons, as against 572,400 tons mined and 754,567 tons smelted in 1919.

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 refinery of the International Nickel Company of Canada at Port Colborne, Ont., started operations in July, 1918.



The British America Nickel Corporation has recovered the residues from construction of its smelter at Nickelton, Ont., and of the refinery at Deschenes, Que. The smelter started operations January 17, 1920, and the refinery which produces both refined nickel and copper was put in operation shortly afterwards.

The total production of refined nickel from both the Sudbury and Cobalt district ores amounted in 1920 to 5,486.9 tons, as against 5,064 tons in 1919. There were also recovered 2,444.8 tons of nickel-oxides valued at \$1,144,906 as against 581.4 tons valued at \$340,033 in 1919, and 16.9 tons of nickel salts and nickel castings valued at \$10,056 as against 176.8 tons valued at \$39,598 in 1919.

Metals of the platinum group with also gold and silver are now being recovered in Canada from the treatment of the nickel-copper-matte.

The International Nickel Company of Canada reported recoveries of these precious metals at their Port Colborne plant for the first time in 1919 and again in 1920.

The British American Nickel Corporation has recovered the residues from the treatment of the matte at Deschenes, Que., but these residues are being stored for future treatment.

The exports of nickel in 1920 were: Nickel fine 8,498,300 pounds valued at \$2,982,717 or an average of 35.1 cents per pound, and nickel in ore, matte, speiss 51,701,000 pounds valued at \$9,006,140 or 17.4 cents per pound. The exports in 1919 were: Nickel fine 10,621,000 pounds valued at \$3,292,420, or an average of 31.0 cents per pound, and nickel in ore, etc., 30,395,400 pounds valued at \$4,785,173, or an average of 15.74 cents per pound.

The imports of nickel into the United States in 1920 which include small quantities from other sources as well as from Canada are given by the Department of Commerce, Washington, as 41,586,108 pounds contained in ore, matte, etc., and valued at \$8,463,872, or an average of 20.4 cents per pound, and manufactured nickel, valued at \$2,396,010.

The exports from the United States of nickel, nickel oxides, etc., were in 1920 1,215,232 pounds, valued at \$574,845 or an average of 47.3 cents per pound. The value per pound of these exports from the United States to different countries ranged from 43.9 cents to 50.7 cents, or an average of 47.3 cents per pound. The value per pound in 1919 ranged from 36.6 cents to 60.6 cents per pound with an average of 44.6 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 1919 and 1920.

<i>Production of Nickel in Canada.</i>		1916	1917	1918	1919	1920
<b>From Nickel copper ores:</b>						
Ore mined.....	Tons	1,566,333	1,518,783	1,641,617	572,400	981,268
Ore smelted.....	"	1,521,689	1,453,661	1,559,892	754,567	937,874
Bessemer matte made.....	"	80,011	78,897	87,184	42,736	57,892
Copper content of matte.....	Lbs.	44,859,321	42,302,588	46,964,651	24,197,382	31,914,000
Nickel content of matte.....	"	82,566,862	83,773,319	91,771,288	44,070,609	60,918,000
<b>From Silver-Cobalt-Nickel ores:</b>						
Nickel as metal or contained in oxide, etc.....	"	361,702	556,961	736,005	474,274	218,354
<b>Exports of Nickel from Canada:</b>						
(Total).....	Lbs.	80,441,700	82,272,400	87,678,500	41,016,400	60,199,300
Nickel in matte or speiss.....	"	80,331,700	82,272,400	85,767,700	30,395,400	51,701,000
Nickel refined.....	"			1,910,800	10,621,000	8,498,300
Exported to Great Britain.....	"	11,136,900	10,506,400	13,007,600	4,617,900	13,399,800
Exported to United States.....	"	69,304,800	70,766,000	74,613,800	34,881,500	45,451,000
Exported to other countries.....	"			57,100	1,517,000	1,348,400
<b>Imports of Nickel into U.S.:</b>						
Gross tons of ore and matte.....		59,741	61,053	59,621	23,057	32,650
Nickel contents.....	Lbs.	72,611,492	75,510,793	73,193,205	29,303,228	41,586,108
Manufactures of Nickel.....	"			24,974	7,355,761	(a)
<b>Exports of Nickel from U.S.:</b>						
To Belgium.....	Lbs.					594,976
France.....	"	2,823,132	1,232,142	2,233,736	1,340,119	72,912
Italy.....	"	2,715,521	5,470,042	5,100,847	525,940	
Netherlands.....	"	523,463			61,197	
Russia in Europe.....	"	7,767,875	168,000			
United Kingdom.....	"	16,674,487	14,409,272	7,803,178	747,437	69,622
Japan.....	"	245,920	275,018	2,063,933	582,946	352,534
Russia in Asia.....	"	1,148,366				
Other countries.....	"	1,505,247	438,346	267,806	551,123	124,888
Total.....		33,404,011	21,992,820	17,469,500	3,814,762	1,215,232

(a) Quantities not given.

## PLATINUM

The most important sources of the metals of the platinum group in Canada are those of the nickel-copper ores. No attempt had been made previous to 1919 to recover these metals in Canada.

The International Nickel Company of Canada which is operating a refinery at Port Colborne, Ont., reports for 1920 a recovery in an impure state of 88.7 ounces of platinum; 173.8 ounces of palladium; 19.6 ounces of the combined metals, rhodium, ruthium, osmium and iridium, with also 290 ounces of gold and 37.957 ounces of silver. The recovery in 1918 was 25 ounces of platinum and 62 ounces of palladium with also a small quantity of gold and silver. The British America Nickel Corporation which is operating a refinery at Deschenes, Que., is storing the residues from the refinery for future treatment.

The recoveries at the New Jersey plant of the International Nickel Company which are believed to be largely if not entirely derived from the treatment of the Sudbury matte were in 1920: 488.9 ounces of platinum; 739.2 ounces of palladium; 309.3 ounces of rhodium and 102.4 ounces of the combined metals osmium, iridium and ruthenium.

The production of alluvial sands is reported as 17 crude ounces, as against 25 ounces in 1919.

The exports of platinum in 1920 are reported by the Customs Department as follows, viz: Platinum in ore, concentrate, etc., 473 ounces, valued at \$53,956; and platinum "old scrap," 317 ounces valued at \$31,784.

The price of platinum in New York in 1920 as given by the "Engineering and Mining Journal" declined from \$155 per ounce in January to \$130 in April and then to a minimum of \$75 in June. By September it had risen to \$115 and at the end of the year stood at \$105.

## SILVER

The total production of silver in 1920 amounted to 12,793,541 fine ounces valued at \$12,908,683 or an average of 100.9 cents per ounce, as against 16,020,657 fine ounces valued at \$17,802,474 or an average of 111.122 cents per ounce in 1919, a decrease of 20.8 per cent in quantity and 27.5 per cent in value.

Of the total production 8,797,781 ounces, or 68.7 per cent was produced as bullion and refined silver; 2,291,585 ounces or 17.9 per cent as contained in blister copper and lead bullion; and 1,704,175 ounces, or 13.4 per cent estimated as recovered from ores exported.

The production in Quebec amounted to 60,874 ounces as against 140,926 ounces in 1919 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 was 9,542,466 ounces as against 12,117,878 ounces in 1919 and was derived as in past years mostly from the silver-cobalt-nickel ores of Cobalt and adjacent districts.

Of the total Ontario production 5,308,852 ounces or 55.6 per cent were recovered in the mills and reduction works of Cobalt; 3,335,076 ounces or 35.0 per cent were recovered in the southern Ontario smelters; 136,874 ounces or 1.4 per cent was the production from the gold mines and the Port Colborne refinery, and 761,664 ounces, or 8.0 per cent were the estimated recoveries from ores, residues, etc., exported to United States.

The production in Manitoba was 15,330 ounces as against 20,760 ounces in 1919 and was derived from the gold and copper ores of The Pas district, northern Manitoba.

The British Columbia production was 3,158,707 ounces, as against 3,713,537 ounces in 1919. This production includes 1,131,116 ounces, or 35.8 per cent of silver in lead bullion 1,145,165 ounces, or 36.5 per cent contained in blister copper; 831,637 ounces, or 27.9 per cent the estimated recoveries from ores exported.

The production from the Yukon Territory was 16,164 ounces as against 27,556 ounces in 1919, and were derived mostly from the alluvial sands, with also a small recovery from the gold and copper ores.

The price of silver in New York in 1920 reached a maximum of \$1.35 in January then gradually declined to 80 cents in June and about 60 cents in December. The average for the year was 100.9 cents.

Purchase in the United States of domestic silver under the Pittman Act began in May, at the rate of \$1 per ounce 1,000 fine, and purchases have averaged 4,000,000 ounces per month.

The exports in 1920 were: Silver in ore, concentrate, etc., 1,903,130 ounces valued at \$2,007,550 and silver in bullion 9,931,374 ounces valued at \$10,230,659, as against silver in ore, concentrate, etc., 4,225,007 ounces valued at \$3,735,830 and silver in bullion 15,132,069 ounces valued at \$14,647,072 in 1919.

The imports were: Silver sterling, etc., valued at \$314,869 and silver bullion valued at \$2,453,450, as against silver sterling valued at \$131,766 and silver bullion valued at \$3,458,097 in 1919.

## ZINC

The production of zinc in 1920 amounted to 40,166,200 pounds or 20,083.1 tons, which at the average price for the year of 7.671 cents per pound would be worth \$3,081,149 as against 32,194,707 pounds valued at \$2,362,448, or an average of 7.338 cents per pound in 1919.

The production in 1920 included 18,517 tons of refined zinc produced at Trail, B.C., and 1,566.1 tons being the estimated recoveries from 4,967 tons of ore and concentrates shipped to United States smelters (20 per cent being allowed for smelter losses). The production in 1919 included 12,326 tons of refined zinc and 3,771.3 tons of recoveries from ores exported.

The total zinc ore and concentrates shipped from the mines in 1920 amounted to approximately 247,089 tons with a metal content of 89,209,108 pounds of zinc, as against 135,535 tons containing 59,959,709 pounds of zinc in 1919.

The production as in past years, was derived mostly from the lead-zinc mines of British Columbia with the exception of 1,120,200 pounds credited to Quebec.

The exports of zinc in 1920, as reported by the Department of Customs were: Zinc ore and concentrates 3,126 tons, valued at \$122,387 or an average of \$39.15 per ton; and spelter 6,979,900 pounds, valued at \$512,279 or an average of 7.34 cents per pound. In 1919 the exports were: Zinc ore and concentrates 6,630 tons, valued at \$296,212 or an average of \$44.68 per ton, and metallic zinc 7,693,800 pounds, valued at \$701,249, or an average of 9.11 cents per pound.

The imports of zinc from Canada into the United States as reported by the United States Department of Commerce, were: Zinc in ore 3,588,893 pounds valued at \$68,286, as against 7,555,189 pounds, valued at \$115,974 in 1919.

The imports of zinc as reported by the Canadian Customs Department in 1920 were valued at \$1,900,920, as against a value of \$1,865,531 in 1919.

## IRON ORE

The shipments of iron ore from Canadian mines which in 1919 were the lowest that had been recorded in 19 years have again fallen off in 1920 to 127,826 tons valued at \$510,525 as compared with 197,170 tons valued at \$693,386 in the previous year, were it not for the continued operations at the Magpie and Moose Mountain mines in Ontario, commercial production would practically cease.

The shipments in 1920 included 960 tons of titaniferous ore shipped from Baie St. Paul on the north shore of the St. Lawrence, a little over 1,000 tons from Texada Island, B.C., shipped to Seattle and the balance from the Magpie and Moose Mountain mines.

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 118,990 short tons of roasted ore were 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 till the end of November, in the development of the milling and briquetting processes which are being employed in the treatment of these low grade magnetites. The raw ore averages about 33.8 per cent iron, while the briquettes produced during 1920 averaged about 66 per cent iron. A large tonnage of raw ore was mined during the year but only a comparatively small quantity, 7,664 short tons of briquettes were marketed.

In the Great Lakes region ore prices Lake Erie ports were from February 2, 1920: Old Range Bessemer \$7.45 per gross ton (basis 55 per cent iron): Messabi Bessemer \$7.20; Old Range Non-Bessemer \$6.70 (basis 51.5 per cent iron): Messabi Non-Bessemer \$6.55. During the season of 1919, the ruling prices were \$1 per ton less than these figures.

Of the total shipments in 1920 mine operators reported 7,855 tons as sold for export to the United States and 119,971 tons shipped to Canadian blast furnaces. The Customs Department records show exports of iron ores to the United States during the year of 19,879 tons valued at \$99,179 and imports of iron ore amounting to 1,938,943 tons valued at \$5,812,912.

The quantity of iron ore charged to blast furnaces in 1920 was 2,118,885 tons of which 149,515 tons were of domestic origin and 1,969,370 tons imported. The imported ore included 621,370 tons of Newfoundland ore and 1,348,000 tons of ore from the United States. Shipments of iron ore from Wabana Mines, Newfoundland in 1920 by the two Canadian companies operating there were 644,937 short tons, of which 609,714 tons went to Nova Scotia and 35,223 tons to Great Britain and Europe, as against 499,972 tons in 1919 and 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 1920 excluding the production of ferro-alloys was 1,090,318 short tons (973,498 gross tons), having a value of \$30,578,253, as compared with a total production in 1919 of 917,346 short tons (819,447 gross tons) valued at \$24,577,589, showing an increase of 172,972 tons, or 18.8 per cent. Of the 1920 total, 1,081,374 tons were made in blast furnaces and 8,944 tons (subject to revision) were made in electric furnaces from scrap metal, chiefly shell turnings. In 1919 the blast furnace production was 910,080 tons, and the electric furnace production from scrap steel was 7,701 tons.

The production of blast furnace pig-iron in Nova Scotia in 1920 was 332,493 tons as against 285,087 tons in 1919. In Ontario the production of blast furnace pig-iron was 748,881 tons as against 624,993 tons in 1919.

By grades the 1920 production included: Basic, 740,598 tons; foundry and malleable, etc., 340,776 tons; low phosphorous iron (electric furnace) 8,944 tons. By grades the 1919 production included: Basic, 580,426 tons; Bessemer, 7,637 tons; foundry and malleable, etc., 322,017 tons; low phosphorous iron (electric furnace) 7,701 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 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.

Electric furnaces were operated for the production of pig-iron from scrap at Hull, Shawenegan Falls and Montreal, in Quebec, and at Orillia in Ontario.

The production of ferro-alloys in Canada in 1920, including ferro-silicon, spiegeleisen and ferro-phosphorus, all with the exception of the spiegeleisen being made in electric furnaces, was about 27,712 tons valued at \$1,433,350. In 1919 the production was 48,601 tons valued at \$2,000,809.

The exports of pig-iron during 1920 were 102,628 tons valued at \$3,628,657, or an average of \$35.25 per ton, and of ferro-alloys 25,422 tons valued at \$1,297,720, or an average of \$51.04 per ton. The exports of pig-iron included 82,772 tons to the United States, 18,902 to the United Kingdom, and 954 tons to other countries. The ferro-alloy exports included 1,914 tons to the United Kingdom, 20,657 tons to the United States, and 2,831 tons to other countries.

The imports during 1920 included 57,483 tons of pig-iron valued at \$2,383,442, or an average of \$41.46 per ton, and 8,033 tons of ferro-alloys valued at \$1,324,061, or an average of \$164.82 per ton, making a total import of pig-iron

and ferro-alloys of 65,516 tons valued at \$3,707,503. The United States trade records show exports to Canada during 1920 of pig-iron and ferro-alloys amounting to 56,100 gross tons (62,832 short tons) valued at \$2,872,466.

## STEEL

The total production of steel ingots and direct steel castings in 1920 (subject to revision) was 1,242,012 short tons (1,108,939 long tons), of which 1,176,153 tons were ingots and 65,859 tons direct steel castings.

The total production of steel in 1919 was 1,030,342 short tons (919,948 long tons), of which 993,039 tons were ingots and 37,303 tons direct castings.

The 1920 production included 25,669 tons of electric furnace steel, as against 15,502 tons of electric furnace steel in 1919 and 119,130 tons in 1918.

The exports of steel during 1920 as per Customs Department records included: billets, blooms and ingots, 69,269 tons valued at \$3,696,974, or an average of \$53.37 per ton; bars and rods, 85,166 tons valued at \$5,687,611, or an average of \$86.82 per ton; steel rails, 61,117 tons valued at \$2,676,933, or an average of \$43.80 per ton; wire and wire nails valued at \$7,407,958; structural steel, 3,458 tons valued at \$358,294, or an average of \$103.62 per ton; scrap iron and steel, 129,015 tons valued at \$2,447,684, or an average of \$18.97 per ton, together with a large quantity of manufactured iron and steel goods.

## ASBESTOS

Asbestos mining has during the past two years 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. In 1920 there was a slight increase in the total output and a very material increase in the sales of asbestos, with a corresponding decrease in stocks on hand at the end of the year.

The total output of crude and milled fibre during 1920 was 157,904 short tons, as compared with 157,572 tons in 1919.

The actual sales of asbestos, excluding asbestic, were about 30,966 tons greater than in 1919 and at higher prices. The total sales of crude were 3,652 tons at an average price of \$980 per ton, as against sales in 1919 of 3,928 tons at an average of \$818.23 per ton. The total sales of mill stock in 1920 were 164,079 tons at an average value of \$61.55, as against total sales in 1919 of 132,837 tons at an average of \$57.93 per ton.

The average number of men employed in mining was 1,890 and in milling 1,340, or a total of 3,230, and total wages paid were \$4,315,242. In 1919 the total number of men employed was 3,567, including 2,060 in mines and 1,507 in mills, and wages paid were \$3,954,407.

The total rock mined and quarried in 1920 was 2,912,221 and the rock milled 2,453,867 tons. There was thus a recovery of 108 pounds of asbestos per ton of rock mined, and a mill recovery of 6.68 per cent of the rock milled as asbestos fibre. In 1919 the total asbestos recovered was about 102 pounds per ton of rock mined and the mill recovery of asbestos fibre 5.8 per cent of the rock milled.

## Output, Sales, and Stocks of Asbestos

	Output		Sales		Stocks on hand December 31		
	Tons	Tons	Value	Per ton	Tons	Value	Per ton
			\$	\$		\$	\$
1920							
Crude.....	3,734	3,652	3,578,940	980 00	1,113	1,281,733	1,151 60
Mill stock.....	154,170	164,079	10,098,901	61 55	18,283	1,324,369	72 44
	157,904	167,731	13,677,841	81 55	19,396	2,606,102	134 36
Asbestic.....		20,956	57,601	2 75			
Total.....		188,687	13,735,442				
1919							
Crude.....	4,065	3,928	3,214,022	818 23	1,338	974,260	728 14
Mill stock.....	153,507	132,837	7,695,430	57 93	31,110	1,952,629	62 76
	157,572	136,765	10,909,452	79 77	32,448	2,926,889	90 20
Asbestic.....		22,471	65,917	2 93			
Total.....		159,236	10,975,369				

Exports of asbestos during 1920 were 152,740 tons valued at \$11,521,536, or an average of \$75.43 per ton, and of asbestic sand and waste 36,303 tons valued at \$365,920, or an average of \$10.08 per ton. There was also an export of manufactures of asbestos valued at \$196,067. The destinations of asbestos exports were: United Kingdom, 11,881 tons valued at \$1,270,172; United States, 115,283 tons valued at \$7,955,772; France, 2,011 tons valued at \$216,867; Italy, 2,390 tons valued at \$290,609; Japan, 4,863 tons valued at \$293,344; and other countries, 16,312 tons valued at \$1,494,772.

The exports in 1919 were: Asbestos, 119,122 tons valued at \$9,625,695, or an average of \$80.39 per ton; asbestic sand and waste, 25,306 tons valued at \$260,775, or an average of \$10.31 per ton; and manufactures of asbestos valued at \$232,501.

The imports of asbestos and manufactures of asbestos in 1920 were valued at \$812,042, as against imports in 1919 valued at \$656,037.

## CHROMITE

Shipments of chrome ore and concentrates from the Eastern Townships of the Province of Quebec were about 2,000 tons greater in 1920 than in the previous year. No shipments were reported from British Columbia. The total shipments of ores and concentrates were 10,500 short tons valued at \$244,984 which included 2,579 tons of ore averaging about 40 per cent  $\text{Cr}_2\text{O}_3$  valued at \$72,100 and 7,921 tons of concentrates averaging about 49.9 per cent  $\text{Cr}_2\text{O}_3$  valued at \$172,884. The total  $\text{Cr}_2\text{O}_3$  content was about 4,961 tons. Of the total shipments 1,436 tons were sold in Canada and 9,064 tons sold for export.

The 1919 shipments were 8,541 short tons of ore and concentrates valued at \$228,898 having a total of  $\text{Cr}_2\text{O}_3$  content of 3,764 tons and included crude ore 3,376 tons valued at \$69,894 averaging 35.3 per cent  $\text{Cr}_2\text{O}_3$ , and concentrates 5,165 tons valued at \$159,004 and averaging 49.8 per cent  $\text{Cr}_2\text{O}_3$ . The crude ore shipped included 371 tons sold for consumption in Canada and 3,005 tons sold for export—all the concentrates with the exception of about 2 tons were sold for export.

The exports of chromite in 1920 according to trade reports were 8,431 tons valued at \$151,456, or an average of \$21.89 per ton as compared with exports in 1919 of 9,078 tons valued at \$198,733, or an average of \$21.89 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 1920 were 1,358,080 pounds valued at \$267,235 and the imports of bichromate of potash 37,825 pounds valued at \$14,256.

## COAL

Early statements of the probable coal production during 1920, made in December, slightly underestimated the quantity of production, and considerably underestimated the values now reported by the operators. The following figures are still subject to revision, since the complete production records for a number of collieries have not yet been made available; however, it is believed that the estimates made for them have been quite sufficiently generous.

The total production of marketable coal during 1920 (comprising sales, colliery consumption and coal used in making coke, or used otherwise by colliery operators) was 16,623,598 short tons valued at \$77,326,853, or an average of \$4.65 per ton, and was the largest tonnage that has been obtained in any one year.

The total production in 1919 was 13,681,218 tons valued at \$54,413,349, compared with which the 1920 production shows an increase of 2,942,380 tons, or 21.5 per cent, and \$22,913,504, or 42.1 per cent in value.

The total output of coal including waste and unmarketable slack in 1920 was 16,976,771 tons as against 14,080,655 tons in 1919.

Each of the provinces, with the exception of New Brunswick and Saskatchewan, has shown substantial increases over the previous year's production. Nova Scotia presents an increase of 675,172 tons, or 11.8 per cent; New Brunswick a decrease of 17,944 tons, or 10 per cent; Saskatchewan a decrease of 30,309 tons, or 8 per cent; Alberta an increase of 1,894,811 tons, or 38.2 per cent, and British Columbia an increase of 420,987 tons, or 17.3 per cent.

### Output<sup>1</sup> and Production<sup>2</sup> of Coal, 1919 and 1920

(In short tons.)

	1919				1920			
	Output	Production	Value of production	Ave. per ton	Output	Production	Value of production	Ave. per ton
			\$	\$			\$	\$
Nova Scotia.....	5,804,674	5,720,373	22,078,726	3.86	6,457,064	6,395,545	28,379,653	4.44
New Brunswick....	178,438	179,108	794,761	4.42	160,987	161,164	936,282	5.81
Saskatchewan.....	384,117	380,169	820,522	2.16	352,206	349,860	832,383	2.38
Alberta.....	5,004,268	4,964,535	18,294,495	3.69	6,900,641	6,859,346	30,147,466	4.40
British Columbia..	2,707,958	2,435,933	12,420,445	5.10	3,104,410	2,856,920	16,026,639	5.61
Yukon Territory...	1,200	1,100	4,400	4.00	863	763	4,430	5.81
Total.....	14,080,655	13,681,218	54,413,349	3.98	16,976,771	16,623,598	77,326,853	4.65

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

The exports of coal in 1920 were 2,558,174 tons valued at \$18,014,899, or an average of \$7.04 per ton, as against exports in 1919 of 2,070,050 tons valued at



\$12,438,885, or an average of \$6 per ton, showing an increase of 488,124 tons, or 23.6 per cent in quantity.

The total imports of coal of all classes in 1920, "Entered for consumption," as recorded by the Department of Customs, were 18,742,542 tons, valued at \$98,033,598, as against imports in 1919 of 17,308,837 tons valued at \$61,160,799. The record shows a slight decrease in the imports of anthracite coal, but an increase in the imports of bituminous coal.

### Imports of Coal

	1919			1920		
	Tons	Value	Average	Tons	Value	Average
Bituminous round and run of mine .....	10,127,965	24,750,717	2.44	11,548,475	50,808,626	4.40
Bituminous slack .....	2,228,197	4,814,388	2.16	2,312,754	10,451,621	4.52
Anthracite coal and dust .....	4,952,675	31,595,694	6.38	4,881,313	36,773,351	7.53
Total .....	17,308,837	61,160,799	3.53	18,742,542	98,033,598	5.32

The estimated consumption of coal based on production, exports and coal imported as "Entered for consumption," amounted in 1920 to 33,807,966 tons as compared with a corresponding consumption in 1919 of 28,863,017 tons.

*Coke:* The total output of coke in 1920 was 1,306,644 short tons; from a total coal charge of 2,068,127 tons of which 1,089,024 tons were imported. Sales were 135,818 tons; quantity used by operators 1,190,702 tons, giving a production of 1,326,520 tons valued at \$14,509,074. The recovery of by-products at Sydney, N.S., Hamilton and Sault Ste. Marie, Ont.; and at Anyox, B.C. included 14,026,172 gallons tar and 19,142 tons ammonium sulphate. The corresponding figures for 1919 were: output of coke, 1,160,470 tons from a total coal charge of 1,880,541 tons; production 1,133,680 tons valued at \$9,720,387; tar 12,394,249 gallons and sulphate of ammonia 11,765 tons.

In 1919 the total output 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 averaging 0.617 tons of coke per ton of coal charged. The coke used or sold by producers during the year was 1,133,680 tons valued at \$9,720,387, or an average of \$8.58 per ton. Of the total output 1,036,229, or 89 per cent was by-product coke and 134,241 tons beehive coke.

The exports of coke in 1920 were 39,536 tons valued at \$390,161, or an average of \$9.87 per ton, as against exports in 1919 of 14,709 tons valued at \$129,793, or an average of \$8.75 per ton. The imports of coke in 1920 were 586,406 tons valued at \$6,458,596 or an average of \$11 per ton, as against imports in 1919 of 383,374 tons valued at \$2,405,740, or an average of \$6.27 per ton.

### FELDSPAR

The shipments of feldspar in 1920 have been much more than double those of the previous year—in fact almost double those of the highest previous year's production. Returns received show shipments of 36,856 tons valued at \$274,075 which includes 649 tons valued at \$10,052 from Quebec, and 36,207 tons valued at \$264,023 from Ontario.

The Quebec production includes a considerable proportion of dental spar valued at about \$35 per ton. The shipments from Ontario quarries have been valued at from \$5.50 to \$9 per ton, f.o.b. cars at quarry.

The exports are reported as 38,768 tons valued at \$219,744.

The shipments of feldspar in 1919 were: 14,679 tons valued at \$86,231 and included 925 tons valued at \$13,073 from Quebec and 13,754 tons valued at \$73,158 from Ontario.

### FLUORSPAR

Although occasional shipments had previously been made the regular production of fluorspar began in 1916 and during this and the three following years the Madoc district in Ontario has been the principal source of production which in 1920 has reached a maximum at 11,229 tons valued at \$260,446 of which 3,752 tons valued at \$68,475 are credited to Ontario and 7,477 tons valued at \$191,171 to British Columbia.

The Rock Candy group situated near Grand Forks in British Columbia was opened up in 1918 and in 1919 contributed 32 per cent of the total shipments which were 5,063 tons valued at \$97,837. In 1920 British Columbia has contributed over 66 per cent of the total.

The exports of fluorspar during 1920 were 6,900 tons, valued at \$109,683.

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 were reduced to 1,360 tons valued at \$100,221 almost all from Ontario, but have increased again in 1920 to a total of 2,227 tons valued at \$173,537, which included 234 tons of No. 1 flake valued at \$483,621; 234 tons of No. 2 flake valued at \$28,512 and 1,769 tons of No. 3 and dust valued at \$96,663.

Of the total, Quebec contributed 233 tons valued at \$31,913, and Ontario 1,994 tons valued at \$141,624.

The exports of graphite crude and refined are reported as 2,142 tons valued at \$159,817.

The imports of graphite during 1920 included: plumbago not ground valued at \$4,352; ground and manufactures of, valued at \$102,568 and clay crucibles valued at \$86,619 and plumbago crucibles valued at \$90,092. The imports in 1919 included plumbago not ground valued at \$6,604; ground and manufactures \$80,970; crucibles, clay or plumbago \$59,239.

### GYPSUM

Gypsum production has exhibited a substantial gain in 1920 the value of the shipments of crude, crushed or calcined product being greater than in any previous year and the tonnage the highest since 1915. The total quantity of gypsum rock quarried in 1920 was 460,354 tons of which 148,964 tons were calcined. The shipments of all grades totalled 429,144 tons valued at \$1,876,595 and included: Lump gypsum 262,442 tons valued at \$439,762; crushed 48,379 tons valued at \$146,947; fine ground 6,615 tons valued at \$46,584; and calcined 111,708 tons valued at \$1,243,302.

By provinces the shipments were: Nova Scotia 260,661 tons valued at \$556,356; New Brunswick 49,405 tons valued at \$428,183; Ontario 74,707 tons valued at \$404,162 and Manitoba 45,371 tons valued at \$487,894.

In 1919 the quantity of gypsum rock quarried was 303,998 tons of which 121,496 tons were calcined. The shipments included: Lump 172,781 tons valued at \$206,858; crushed 27,939 tons valued at \$68,002; fine ground 3,842 tons valued at \$18,901; calcined 94,501 tons valued at \$921,526, or a total of 299,063 tons valued at \$1,215,287.

The exports of crude gypsum were: 244,428 tons valued at \$413,522, gypsum ground, plaster of paris, etc., valued at \$232,736. The corresponding exports in 1919 were: Crude gypsum 148,394 tons valued at \$199,857 and gypsum ground, etc., valued at \$140,235.

The imports of gypsum of all grades during 1920 were: 5,234 tons, \$78,302 and included: Crude gypsum 2,294 tons valued at \$25,477, gypsum ground, etc., 118 tons valued at \$3,966, and plaster of paris 2,822 tons valued at \$48,859. The imports in 1919 totalled 2,848 tons valued at \$47,455.

## MAGNESITE

The production of magnesite obtained from the deposits in Argenteuil county, Quebec, is marketed as crude magnesite, calcined, and dead burnt clinker (the latter being sintered in rotary kilns after mixture with about 5 per cent of iron ore in the form of magnetite).

The tonnage and value of shipments in 1920 were greater than those of 1919 but less than the production of the three previous years.

The total shipments in 1920 were 18,378 tons valued at \$512,756, and included 4,296 tons of crude magnesite valued at \$39,779; 3,154 tons of calcined valued at \$64,402 and 10,928 tons of clinkered, or dead burned valued at \$408,575.

The tonnage of crude magnesite quarried during the year was 31,040; 30,230 tons were treated in the calcining and clinkering mills from which was produced 3,152 tons of calcined magnesite and 11,894 tons of clinkered or dead burned material.

The operators report 7,753 tons out of total shipments as having been sold for export.

In 1919 the total shipments were 11,273 tons valued at \$328,465 and included: 1,638 tons of crude magnesite, valued at \$14,664 and 9,635 tons of calcined and clinkered valued at \$313,801.

In 1920 the exports of magnesite crude were 155 tons valued at \$1,662, and magnesite calcined, dead burned, etc., 217,181 tons valued at \$425,048 making a total of 217,336 tons valued at \$426,710 as compared with exports to the value of \$232,377 in 1919.

## 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 59 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 1920 was 196,937 barrels of 35 imp. gallons, having a value of \$821,545, as compared with a total production in 1919 of 240,466 barrels, valued at \$736,324.

A bounty of 1½ 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 180,071 barrels (6,302,485 imp. gallons) which at the average price per barrel of \$4.03½, was worth \$726,286. The New Brunswick production was 5,148 barrels valued at \$19,964 or an average value of \$3.88.

During the past six years there has been a small 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 1920 was 11,718 barrels valued at \$75,295.

The 1919 production of crude oil included 4,225 barrels valued at \$13,141 from New Brunswick; 219,804 barrels valued at \$625,342 from Ontario, and 16,437 barrels valued at \$97,841 from Alberta.

The price per barrel of crude oil at Petrolia, was quoted at \$3.38, from July 19, 1919 to January 12, 1920, when the price was increased to \$3.63. On March 1, 1920, the price was again increased by 45 cents to \$3.88, and on March 10, a further increase of 25 cents went into force making the price from that date to the end of the year \$4.13. The average price for the year based upon monthly settlements was \$4.03½. The average monthly price in 1919 was \$2.87½, as against an average of \$2.69½ in 1918; \$2.33½ in 1917, \$1.98 in 1916 and \$1.39½ 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, 65,081; Oil Spring, 39,388; Moore township, 7,036; Sarnia township, 3,495; Plympton township, 531; Bothwell, 26,564; Tilbury E., 623; West Dover, 12,171; Raleigh township, 489; Dutton, 837; Onondaga, 341; Moza township, 24,036; Thamesville, 1,131.

The production by districts in 1919, in barrels, was: Petrolia and Enniskillen, 70,087; Oil Spring, 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.

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 1920 was 58,940,118 gallons, and the quantity of naphtha, or gasolene, and other light oils was 99,826,802 gallons, or a total of oils inspected 158,766,920 gallons.

In 1919, ten oil refineries in Canada used 299,986,199 gallons of crude oil of which 292,281,146 gallons were imported, and 7,705,053 gallons were obtained from Canadian wells. The production of refined oils and petroleum products included gasolene and motor oils, 87,248,413 gallons; benzoline, benzene and other light oils, 4,516,783 gallons; illuminating oils, 55,360,322 gallons; lubricating oils, 16,113,694 gallons; gas and fuel oils and tar, 95,216,183 gallons; wax and candles, 11,271,993 pounds. There was also a production of asphalt and other products. The total value of the products of refineries was \$42,856,074.

According to inspection returns of the Inland Revenue Department, the total quantity of illuminating oils inspected during the calendar year 1919 was 63,480,214 gallons and the quantity of naphtha or gasolene and other light oils was 97,519,950 gallons.

Exports of petroleum entered as crude mineral oil in 1920 were 2,684,427 gallons valued at \$293,325, and of refined oil 1,243,335 gallons valued at \$205,999. There was also an export of naphtha and gasolene of 160,433 gallons valued at \$59,432, and an export of mineral wax amounting to 7,125,900 pounds valued at \$626,799. The exports in 1919 were: Crude oil, 603,748 gallons, valued at \$40,648; and of refined oil, 2,846,293 gallons, valued at \$287,170; naphtha and gasolene, 1,566,707 gallons, valued at \$428,754.

The total value of the imports of petroleum and petroleum products in 1920 was \$47,098,332, as against a value of \$29,519,196 in 1919, and a value of \$30,649,570 in 1918.

The total quantity of petroleum oils, crude and refined, imported in 1919, was 491,372,140 gallons, as compared with 451,211,270 gallons in 1919. A detailed record of the various classes of imports will be found in the accompanying tables.

### 1919 and 1920

#### Imports of Petroleum and Petroleum Products during the Calendar Years

	1919		1920	
	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	305,748,960	15,104,287	290,736,366	20,814,899
(2) Petroleum (not including crude petroleum imported to be refined, or illuminating or lubricating oils) -8235 specific gravity or heavier at 60 degrees temperature	99,559,068	4,702,771	122,750,650	7,790,137
(3) Petroleum imported by miners or mining companies or concerns for use in the concentration of ores of metals in their own concentrating establishments			16,249	1,341
(b) Crude petroleum, gas oils (other than benzene naphtha and gasoline)	155,145	23,866	178,641	28,869
(c) Coal and kerosene, distilled, purified, or refined	6,757,159	926,822	14,971,509	2,359,621
(d) Illuminating oils composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon	105,750	77,938	176,340	127,880
(e) Lubricating oils composed wholly or in part of petroleum, costing less than 25 cents per gallon	1,496,809	289,442	881,102	175,478
(f) Products of petroleum, n.o.p.	29,516,589	5,615,622	48,769,546	10,891,302
(g) Lubricating oils, n.o.p.	3,480,183	1,467,593	4,376,192	2,267,611
(h) Gasoline	4,391,607	1,142,855	8,515,545	2,404,488
Total	451,211,270	29,351,196	491,372,140	46,661,638
	Pounds		Pounds	
Paraffin wax	844,838	108,849	1,455,939	168,521
Paraffin wax candles	297,419	59,151	261,794	68,173
		29,519,196		47,098,332

### PYRITES

The shipments of pyrites as sulphur ore from Canadian mines have, during the past two years, been less than half those of 1918. The total shipments in 1920 were 174,744 tons valued at \$751,009 and included 14,817 tons from Quebec; 148,652 tons from Ontario, and 11,275 tons from British Columbia. The total sulphur content of shipments was 67,627 net tons, or an average of 38.7 per cent. Of the total shipments 27,823 tons were sold for consumption in Canada and 146,921 tons for consumption in the United States.

In 1919 the total shipments were 176,487 tons valued at \$522,704 and included 52,746 tons from Quebec; 117,011 tons from Ontario, and 6,730 tons from British Columbia. The total sulphur content was 65,674 tons or an average of 37.2 per cent. Of the total shipments 43,754 tons were sold for consumption in Canada and 132,733 tons for consumption in the United States.

A change was made in the customs classification as from March 1, 1920, covering exports of pyrites and sulphur. The recorded exports in 1920 included

30 tons of pyrites valued at \$63 exported during the first three months and 119,106 tons of sulphur contained in pyrites valued at \$458,340 exported during the last nine months. (The quantity appears to be incorrectly reported). In 1919 the recorded exports were 89,089 tons of pyrites valued at \$388,508.

### SULPHURIC ACID

The total production of sulphuric acid during the twelve months ending December 31, 1920, expressed in terms of 66° Bé, was 82,811 short tons.

The production during the first six months of the year was 38,891 tons and during the last six months 43,920 tons. The ores used in the manufacture of sulphuric acid included 13,534 tons of imported sulphur or brimstone and 16,679 tons of pyrites from Canadian sources containing an average of 37.6 per cent sulphur.

Exports of sulphuric acid during 1920 were 10,033,900 pounds, valued at \$89,992, as against 10,894,200 pounds valued at \$108,392 exported in 1919.

Imports of brimstone, or crude sulphur, in 1920, were 144,733 tons valued at \$2,113,713, as compared with 56,062 tons, valued at \$1,015,223 imported in 1919. Imports of sulphuric acid in 1920 were 320 tons valued at \$22,664 as against imports of 1,437 tons valued at \$38,759 in 1919.

### SALT

The production of salt in Canada continued to increase with fair regularity. The total sales in 1920 from domestic sources including salt equivalent of brine used for chemical manufacturing, were 210,211 tons valued at \$1,547,879 as against sales in 1919 of 148,301 tons valued at \$1,397,929. These values as far as possible exclude the value of packages. The value of packages was in 1920 \$753,763 as compared with \$573,795 in 1919. By grades the production in 1920 included table and dairy 42,475 tons, common fine 39,963 tons; common coarse 122,646 tons; land salt 5,127 tons. The production by grades in 1919 was: table and dairy 34,396 tons; common fine 47,571 tons; common coarse including brine, 64,426 tons; land salt 1,908 tons.

The number of men employed in 1920 was 341 and wages paid \$470,005. In 1919 the average number of men employed was 329 and wages paid \$350,141.

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, and during 1919 there was an experimental production of salt from brines flowing from springs in the Province of Saskatchewan, near Senlac. Development has continued on the deposit rock salt near Malagash, Cumberland county, N.S., the shipments in 1920 having been 3,023 tons valued at \$32,000. This deposit has attracted considerable attention through the discovery of potash minerals associated with the salt.

Exports of salt in 1920 were 303 tons valued at \$9,181. The imports of salt were 155,646 tons valued at \$1,434,687 and included 54,338 tons of fine salt in bulk valued at \$356,389; 28,712 tons of salt in packages valued at \$446,671, and 72,596 tons of salt imported for the use of fisheries valued at \$631,627.

The exports of salt in 1919 were 617 tons valued at \$14,573 and the total imports were 147,406 tons valued at \$1,310,129.

The calculated consumption of salt in 1920 was 365,554 tons valued at \$2,973,385 as compared with a consumption in 1919 of 295,090 tons valued at \$2,693,485. (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 salt works at Sandwich, Ont. Brunner, Mond, Canada, Limited, 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 1920 were: 42,974 tons valued at \$958,628; soda ash (sodium carbonate), 7,458 tons valued at \$372,936; caustic soda, 4,206 tons valued at \$384,260; sal soda, 5,064 tons valued at \$200,788, and chloride of lime, 17,460 tons valued at \$1,034,006.

## 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 to \$27,421,510 in 1919.

In 1920 the value of this production had increased to a new maximum of \$38,184,848. While higher prices have played an important part in this increase of over 39 per cent in value the actual quantities of cement, brick, lime and stone produced has been considerably increased in 1920 over the 1919 production.

*Cement.*—The total quantity of cement sold from Canadian mills in 1920 was 6,651,980 barrels valued at \$14,798,070, or an average of \$2.22 per barrel as compared with sales in 1919 of 4,995,257 barrels valued at \$9,802,433 or an average of \$1.96 per barrel, showing an increase in quantity of 1,656,723 barrels, or 33 per cent, and an increase in total value of \$4,995,637, or 51 per cent.

The total quantity of cement made in 1920 was 6,498,550 barrels as compared with 4,613,588 barrels made in 1919, an increase of 1,884,962 barrels, or 40.8 per cent.

Stocks of cement on hand January 1, 1920, were 1,089,603, and at the end of December this had been reduced to 936,173.

The exports of cement in 1920 were valued at \$2,193,626 as against exports in 1919 valued at \$465,954. In 1919 the value of cement exports greatly exceeded the imports for the first time. In 1920 the quantity is not reported for the first three months but is given as 2,701,584 cwt. for the last nine months. At the average price of 74 cents per cwt. given for the last nine months the estimated quantity exported during 1920 would be 2,964,360 cwt. or 846,960 barrels of 350 pounds each.

The total imports of cement in 1920 were 115,370 cwt., equivalent to 32,963 barrels of 350 pounds each, valued at \$112,466, or an average of \$3.41 per barrel as compared with imports of 14,066 barrels valued at \$51,314, or an average of \$3.65 per barrel in 1919.

The total consumption of cement in 1920 was therefore about 5,837,983 barrels as compared with a consumption of 4,776,346 barrels in 1919, an increase of 1,061,637 barrels, or 22 per cent.

*Clay Products.*—The total value of the production of brick, tile, pottery and other clay products is estimated for 1920 at \$10,533,271 as against a value of \$7,906,366 in 1919, an increase of \$2,626,905, or 33.2 per cent.

*Lime.*—Sales estimated at 9,355,797 bushels, valued at 3,748,463, an increase of 31 per cent in quantity and over 62 per cent in total value. Nine firms reported sales of 35,869 tons hydrated lime, valued at \$481,878, included in above.

*Sand-Lime Brick.*—Sales reported at 46,102 thousand brick valued at \$718,735—nearly double the quantity and total value of 1919.

*Stone Quarries.*—Value of production is estimated at \$5,163,449 as compared with \$4,225,937 in 1919.