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PRELIMINARY REPORT

OF THE

MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR

1922

FEBRUARY 27, 1923

Published by Authority of the Hon. J. A. Robb, M.P.,
Minister of Trade and Commerce



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LIST OF PUBLICATIONS

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General Reports—

- (a) Annual Report on the Mineral Production of Canada.
- (b) Preliminary Reports (semi-annual) on the Mineral Production of Canada.

Coal—

- (a) Annual Report on Coal Statistics for Canada.
- (b) Monthly Report on Coal Statistics for Canada.

In addition to the foregoing reports on mineral production a series of annual bulletins is in preparation each of which will contain statistics relative to a particular metal or non-metallic mineral or to a special section of the mineral industry, and the series when complete will cover every phase of mineral production in Canada.

(2) STATISTICS OF MANUFACTURES.

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- 1. Iron and its Products.
- 2. Manufactures of Non-Ferrous Metals.
- 3. Manufactures of Non-Metallic Minerals.
- 4. Chemicals and Allied Products.

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- (1) Production of Iron and Steel in Canada.

In addition to the foregoing printed summary reports, a series of bulletins is being prepared, each of which deals with a particular phase of manufactures. These latter reports contain all the available statistics on the subject reviewed.

Copies of the available publications may be had upon request.

PREFACE

The present Preliminary Report on the Mineral Production of Canada in 1922 is designed to supplement the Preliminary Report on this subject issued by the Dominion Bureau of Statistics as for the six months ending June 30, 1922, and to present the first official figures available for the whole of the calendar year.

The cordial thanks of the Bureau are tendered to the Dominion Department of Mines and to the several Provincial Departments of Mines, which have without exception assisted materially in the preparation of the report. The thanks of the Bureau are also tendered to mine and quarry owners, operators, and other members of the mining community for their co-operation in supplying the data from which the report has been prepared.

The report has been prepared under the direction of Mr. S. J. Cook, Chief of the Mining, Metallurgical and Chemical Branch of the Bureau, by Mr. A. C. Young, who also directly supervised the work on metals and metalliferous ores. Mr. B. R. Hayden compiled the data on non-metalliferous products.

R. H. COATS,

Dominion Statistician.

Dominion Bureau of Statistics, Ottawa,
February 27, 1923.

Mineral Production of Canada, 1921-1922

	1921		1922		Increase (+) or Decrease (-)	
	Quantity	Value	Quantity	Value	Quantity	Value
METALLIC						
Cobalt, metallic and contained in oxide..... Lbs.	251,986	755,958	443,776	1,442,272	+76.1	+90.8
Copper..... " "	47,620,820	5,953,555	43,321,403	5,797,270	-9.0	-2.6
Gold..... Fine ozs.	926,329	19,148,920	1,230,985	25,446,717	+32.8	+32.8
Iron, pig, from Canadian ore Tons	56,564	1,873,682	16,395	382,000	-71.0	-79.6
Iron ore sold for export..... " "	1,058	3,272	2,400	9,253	+126.8	+182.7
Lead..... Lbs.	66,679,592	3,828,742	94,170,469	6,789,690	+41.2	+77.3
Nickel..... " "	19,293,060	6,752,571	17,496,490	6,123,771	-9.3	-9.3
Palladium..... Crude ozs.	591	38,267	301	16,555		
Platinum..... " "	292	21,910	138	13,471		
Rhodium, Osmium, Iridium, Ruthenium..... Ozs.	57	9,690	125	8,750		
Silver..... Fine ozs.	13,543,198	8,485,355	17,611,646	11,891,560	+30.04	+40.1
Zinc..... Lbs.	53,089,356	2,471,310	65,397,500	3,223,681	+6.2	+30.4
Total value Metallics.....		49,343,232		61,144,990		+23.9
NON-METALLIC						
Actinolite..... Tons	78	975	50	345	-35.8	-64.61
Arsenic, white, and in ore..... " "	1,491	233,763	2,576	321,037	+72.7	+37.33
Asbestos..... " "	92,761	4,906,230	136,657	4,664,106	+47.3	-4.93
Barytes..... " "	270	9,567	289	9,537	+10.7	-0.31
Chromite..... " "	2,798	55,696	1,087	19,566	-61.1	-64.87
Coal..... " "	15,057,498	72,451,656	15,045,286	66,486,025	-0.08	-8.23
Corundum..... " "	403	55,965				
Feldspar..... " "	29,868	230,754	27,878	227,625	-6.66	-1.35
Fluorspar..... " "	5,519	136,267	4,503	102,138	-18.40	-25.04
Graphite..... " "	937	65,862	650	35,624	-30.62	-45.91
Grindstones..... " "	1,281	64,067	1,200	62,000	-6.32	-3.22
Gypsum..... " "	386,550	1,785,538	441,159	2,043,145	+14.12	+14.42
Magnesite..... " "	3,730	81,320	2,811	74,763	-24.63	-8.06
Magnesium sulphate..... " "	2,029	39,506	1,400	31,900	-31.00	-11.66
Manganese..... " "	68	3,400	73	2,044	+7.35	-39.88
Mica..... " "	702	70,063	3,543	129,281	+404.70	+84.52
Mineral water..... Gals	328,273	21,716		24,819		+14.29
Natro-Alunite..... Tons	30	1,500	50	2,500	+66.66	+66.66
Natural gas..... M cu. ft.	14,077,601	4,954,164	14,954,097	5,468,963	+6.22	+19.04
Iron oxides..... Tons	9,048	93,610	7,200	95,857	-20.42	+2.40
Peat..... " "	1,666	6,664	3,000	14,500	+80.07	+117.58
Petroleum, crude..... Bbls.	187,540	641,533	178,567	609,679	-4.78	-4.96
Phosphate..... Tons	30	450	90	1,060	+200.00	+135.55
Pyrites..... " "	32,173	116,326	19,324	80,208	-39.93	-31.05
Quartz..... " "	100,350	312,947	112,716	213,913	+12.32	-31.64
Salt..... " "	164,658	1,673,685	177,193	1,646,666	+7.61	-1.61
Sodium carbonate..... " "	197	14,775	167	12,600	-15.22	-14.72
Sodium Sulphate..... " "	623	18,850	564	8,460	-9.47	-55.11
Talc..... " "	10,124	144,565	13,558	185,197	+33.91	+28.11
Tripolite..... " "	341	11,268	219	5,781	-35.77	-48.69
Total value Non-Metallic.....		87,842,682		82,582,339		-5.99
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement Portland and Puzzolan..... Bbls	5,752,885	14,195,143	6,943,968	15,438,467	+21.0	+9.0
Clay products:-						
Bricks, common..... No.	22,438,243	3,567,503	305,213,280	4,940,902	+38.0	+38.0
" pressed..... " "	80,947,398	1,738,293	65,186,995	1,391,355	-19.0	-20.0
Bricks, hollow building..... " "	3,627,777	177,273	5,263,063	309,543	+45.0	+75.0
ornamental..... " "	1,995,284	50,576	26,165,869	564,843		
Fire brick..... " "	4,502,233	242,462	6,705,127	251,775	+49.0	+4.0
Fire clay..... " "	2,931	29,851	9,832	50,408	+235.0	+69.0
Fire clay blocks..... " "		91,685		68,774		-25.0
Fireproofing and hollow porous blocks..... " "		452,296		270,268		-40.0
Kaolin..... Tons	124	1,888				
Paving brick..... No.			150,813	5,972		
Pottery from domestic clay..... " "		231,262		248,391		+7.0
Sewer pipe..... " "		1,666,584		1,767,054		+6.0
Architectural terra-cotta..... " "		134,193		148,029		+10.0
Tile, drain..... No.		473,952		436,551		-8.0
Lime..... Bush	6,879,067	2,781,197	8,065,304	3,178,115	+17.0	+14.0
Sand and gravel..... Tons	11,574,862	2,537,249	10,139,376	2,624,324	-12.0	+3.0
Slate..... " "		22,325				
Stone..... Tons	3,671,498	6,343,696	4,236,637	7,607,495	+15.0	+19.0
Total value of structural and clay products.....		34,737,428		39,302,266		+13.0
Grand total.....		171,923,342		183,029,595		+6.40

PRELIMINARY REPORT
OF THE
MINERAL PRODUCTION OF CANADA
DURING THE CALENDAR YEAR, 1922

By S. J. Cook, B.A., A.I.C.

Chief of the Mining, Metallurgical and Chemical Branch

An estimate of the value of the mineral production of Canada made during the last week of December, 1921, was short about 1.3 per cent of the figures now available. The following report is as usual based on returns from the mine and smelter operators and while not complete or final, sufficient data were at hand to make a fairly accurate estimate.

The value of the mineral production of Canada in 1922 amounted to \$183,029,595, as compared with \$171,923,342, in 1921. The year's output was made up of: Metallics, \$61,144,990; Non-Metallics, \$82,582,339; Structural Materials and Clay Products, \$39,302,266.

In comparison with preceding years, the mineral production of Canada in 1922 was very creditable and was only exceeded in value by the records established in 1918 of \$211,301,000 and in 1920, when the peak of \$227,859,000 was reached.

The outstanding feature of the metal production was the excellent gain made in the output of gold by the two important producing provinces, Ontario and British Columbia. The total gold production for Canada during the year amounted to more than 1,230,985 ounces and compared with the 1921 output showed an increase of 31.0 per cent. The increased prices and the lively markets for silver and lead were reflected in excellent gains.

Silver advanced 30 per cent in quantity and 40 per cent in value while lead showed an even wider spread between quantity and value percentages, production rising 41.2 per cent and the value increasing more than 77.3 per cent over the record for the previous year.

Nickel and copper were lower than in 1921, although the advance in the price of copper checked the decline in value to 2.6 per cent as compared with a 9 per cent decrease in quantity. Nickel fell off about 9 per cent in both quantity and value. Although the smelter production of blister and converter copper in British Columbia was less than in 1921, the recovery and rise in the price of copper did not occur until about the middle of the year and some important copper mines which were active in 1921 did not appear on the shipping list until nearly the close of the year when there was a desired improvement in the copper industry. The inactivity of the smelting departments of the International Nickel Company in the earlier part of the year and of the British America Nickel Corporation throughout the entire year accounted for the small production of nickel.

The increase in the output of zinc was further emphasized by the rise in price of this metal to an average of 5.716 cents per pound for the year, as

compared with 4-655 cents in 1921, both quotations from the St. Louis market. The 6 per cent increase in quantity resulted in a 30 per cent advance in the total value reported.

The year-end saw a marked revival in the production of cobalt and more than 443,000 pounds valued at \$1,442,000 was produced. Compared with 1921 data, these figures showed 76 per cent greater quantity and nearly 91 per cent increase in value.

Metals as a whole advanced 23.9 per cent to a total value of \$61,144,990 as compared with \$49,343,232 in 1921.

Among the non-metallies the output of coal considering the great loss of time through strikes was most encouraging.

The output of coal from Canadian mines during twelve months of the calendar year 1922 was approximately 15,000,000 tons at an estimated value of \$66,486,025 as compared with 15,057,493 tons valued at \$72,461,656 in 1921; 16,946,764 tons valued at \$82,496,538 in 1920; and 13,919,096 tons, valued at \$55,622,670 in 1919. The great strike which tied up the United States coal mines for several months was reflected in Canada and resulted in a loss of 1,222,288 working days. Fifteen disputes between employees and employers occurred in the coal mining industry in Canada during the twelve months ending December, thirteen of which were in Alberta and southeastern British Columbia, and the other two in Nova Scotia. In all 25,251 men were affected, and of the time lost, 931,960 days were lost in the strike which began on April 1st, and 290,328 days' time was lost in the short strikes originating later in the year. Having in mind the fact that over one million working days time was lost by the employees of the coal mining industry during the year, the output of fifteen million tons may be considered quite satisfactory. Alberta coal mine output amounted to 5,959,000 tons, a little more than half of which was lignite and nearly all the balance bituminous. Nova Scotia contributed 5,558,000 tons and occupied second place among the coal-producing provinces. British Columbia accounted for 2,927,000 tons, and Saskatchewan and New Brunswick followed with 302,000 tons and 297,000 tons respectively.

The output of natural gas from Canadian fields in 1922 amounted to about 14,954,097 thousand cubic feet valued at \$5,468,963. The quantity of gas produced was more than 800,000 thousand cubic feet above the output in the preceding year, and the value in 1922 was approximately \$874,799 more.

Ontario retained the premier position and produced 7,800,000 thousand cubic feet while Alberta followed with an output of 6,400,000 thousand cubic feet. About 753,897 thousand cubic feet was produced from the fields of New Brunswick.

Asbestos mining in Quebec in common with the other asbestos producing countries of the world, suffered a decline in 1921 which continued throughout the first half of 1922. Towards the close of the year, there was a considerable revival in this industry and prospects were much better than at any time previously within the past two years. The reduction in the percentage of royalty taxes imposed by the Provincial Government on all asbestos produced and sold will undoubtedly prove quite a stimulus to the industry as a whole. The manufacture of finished asbestos products is being looked forward to as a coming important industry in the Province of Quebec. Two plants are presently supplying the local demand for asbestos papers, shingles and brake linings, but it has recently been announced that other companies will shortly enter this field.

The output of asbestos in 1922 reached a total of approximately 136,657 tons of all grades, valued at \$4,664,106 as compared with 92,761 tons valued at \$4,906,230 in 1921. The appreciable percentage increase in production was due almost entirely to the activity about the mines during the closing months of the year.

Feldspar mining in the Province of Quebec has been growing apace during the last two years. The industry which is an old one in the province was given a great impetus by the discovery of a large body of cream white orthoclase feldspar in Derry Township in the fall of 1920. From this deposit nearly 10,000 tons of high grade potash feldspar was shipped during 1921 and production during the past year was slightly lower.

The output of gypsum also showed a considerable improvement over the records of the preceding year and amounted in all to 441,159 tons valued at \$2,043,145 as compared with an output in 1921 of 386,550 tons valued at \$1,785,538.

The increase in the production of metals during the past year amounting to approximately \$12,000,000 in value marks a resumption of progress in the metal mining field and points the way to greater prosperity. The slight decline in the production of non-metallies including coal amounted to about \$5,260,343 in value and since the greater part of this decrease was due to loss of production, caused through labour troubles, the slight set-back may be regarded as negligible. In the successful marketing of structural materials and clay products the revival of the building industry has played a great part and during the past year the production of these materials has been considerably increased.

The recovery in mineral production as a whole then to a total value of \$183,029,595 may be considered as most propitious. Comparison with preceding years shows that 1920, 1918 and 1917 were the only years in which this valuation was exceeded.

Mineral Production of Canada by Provinces, 1921 and 1922

	1921		1922		Increase (+) or De- crease (-)
	Value of Production	Per cent of total	Value of Production	Per cent of total	
	\$		\$		\$
Nova Scotia.....	28,912,111	16.82	28,804,474	15.74	- 107,637
New Brunswick.....	1,901,505	1.10	2,414,152	1.31	+ 512,647
Quebec.....	15,157,094	8.82	16,799,688	9.18	+ 1,642,594
Ontario.....	57,356,651	33.36	65,370,366	35.72	+ 8,013,715
Manitoba.....	1,934,117	1.12	2,118,529	1.16	+ 184,412
Saskatchewan.....	1,114,220	0.65	827,645	0.45	- 286,575
Alberta.....	30,562,229	17.78	25,717,572	14.05	- 4,844,657
British Columbia.....	33,230,460	19.33	39,166,611	21.40	+ 5,936,154
Yukon.....	1,754,955	1.02	1,810,555	0.99	+ 55,600
Total.....	171,923,342	100.0	183,029,595	100.0	+11,106,253

METAL PRICES

Although the principal sales of metals mined in Canada are based on New York market prices, the difference in exchange between United States and Canada since 1919 has permitted Canadian mine operators to offset in certain measure the decline in prices which has characterized the metal markets during this period. A table has been prepared which shows the amount paid in Canadian dollars for one American dollar during each month of the years 1920, 1921 and 1922. The figures given were obtained as the average of the maximum and minimum quotations for the month.

EXCHANGE TABLE

Showing the amount paid in Canadian dollars for one United States dollar by months, 1920-1921-1922

Month	1920	1921	1922
January.....	\$ 1-1056	\$ 1-1437	\$ 1-0553
February.....	1-1497	1-1362	1-0351
March.....	1-1178	1-1337	1-0297
April.....	1-1112	1-1216	1-0208
May.....	1-1134	1-1164	1-0125
June.....	1-1381	1-1294	1-0138
July.....	1-1134	1-1328	1-0091
August.....	1-1275	1-1168	1-0023
September.....	1-1075	1-1106	·9998
October.....	1-1016	1-0931	1-0011
November.....	1-2131	1-0904	·9998
December.....	1-1643	1-0687	·9966
Average for the year.....	1-1227	1-1161	1-0145

For statistical and comparative purposes it has always been customary to determine the value of the metals, copper, gold, lead, nickel, silver and zinc as far as possible on the basis of the quantities of metals recovered in the smelters and the total quantities in each case have always been valued at the average market price of the refined metal in a recognized market. In the table given below the average prices of the principal metals for the past five years have been tabulated. The prices given for antimony, cobalt, copper, nickel and silver on the New York market, spelter on the St. Louis market, lead on the Montreal market, are the prices which have been used in this report in computing the value of the production of these metals from Canadian ores in 1922. Gold was as usual valued at \$20-671834 per fine ounce.

Metal Prices

(In cents per pound or ounce)

	1918	1919	1920	1921	1922
Antimony (ordinaries).....Per pound	12-581	8-190	8-490	4-957	5-471
Cobalt....."	250-000	250-000	250-000	300-000	325-000
Copper, New York....."	24-628	18-691	17-456	12-502	13-382
Lead, "....."	7-413	5-759	7-957	4-545	5-734
" Montreal....."	9-250	6-966	8-940	5-742	6-219
Nickel, New York....."	46-250	45-000	45-000	35-000	40-000
Silver.....Per ounce	96-772	111-122	100-900	62-654	67-521
Spelter, St. Louis.....Per pound	7-890	6-988	7-671	4-655	5-716
Tin, New York....."	88-750	63-328	48-273	28-576	31-831

METALLICS

COBALT

The cobalt ores and residues produced from the mines of the Cobalt district are shipped mostly to the South Ontario Smelters, although important quantities of residues have also been exported to Great Britain and Europe.

During the period under review the production of cobalt as metal and contained in the salts of cobalt showed an important increase over the record for 1921. The production was 443,776 pounds which at the average price of \$3.25 per pound would be worth \$1,442,272 as against 251,986 pounds at \$3 per pound or a total of \$755,958. The increase amounted to 76.1 per cent in quantity and to 90.8 per cent in value.

The exports and imports of cobalt for the calendar years 1921 and 1922 follow:—

Imports into Canada and Exports of Cobalt for 1921 and 1922

	1921		1922	
	lbs.	\$	lbs.	\$
<i>Imports—</i>				
Cobalt ore.....	100	131	200	233
Cobalt oxides.....	4,382,275	346,070	7,343,477	443,869
Total.....	4,382,375	346,201	7,343,677	444,102
<i>Exports—</i>				
Cobalt alloys.....	8,617	46,591	4,022	21,398
Cobalt metallics.....	59,435	141,199	111,830	288,776
Cobalt oxides and Cobalt salts.....	190,483	405,300	430,024	770,511
Total.....	288,535	593,090	545,876	1,080,685

COPPER

The total production of copper from all sources in Canada during the twelve months of 1922 was 43,321,403 pounds which at the average price on the New York market for electrolytic copper of 13.382 cents would be worth \$5,797,270. In 1920 when the average price of copper in New York was 17.456 cents a pound, the Canadian production amounted to 81,600,691 pounds, and the value was \$14,244,217. The copper industry has suffered a severe decline, which is more strikingly shown by a comparison of the 1922 figures with those for the year 1918 when a total of 118,769,434 pounds with a value of \$29,250,536 was produced.

Of the production during 1922, a total of 40,408,806 pounds was contained in blister copper and in matte produced in British Columbia and Ontario. The balance, 2,912,597 pounds, was estimated as recovered from ores shipped to the United States for treatment, and as contained in copper sulphate. The total production of refined copper amounted to 730,000 pounds and was produced in the electrolytic refinery of the Consolidated Mining and Smelting Company, at Trail, British Columbia. The nickel refinery at Deschenes owned by the British America Nickel Corporation, was idle throughout the period. The production by these latter companies showed considerable decrease when compared with former years, but the output at Anyox by the Granby Mining, Smelting and Power Company remained about the same as formerly, namely, about 2,500,000 pounds of converter copper monthly.

Ontario's production amounted to 10,888,882 pounds valued at \$1,457,150 as against 12,821,385 pounds valued at \$1,602,930 in 1921. The production was principally derived from the copper-nickel ores of the Sudbury district, and was mainly in the form of matte. During 1921 the copper contents of the matte produced by the Mond and International companies amounted to 10,841,647 pounds. During last year, the plants of the British America Nickel Corporation were closed down owing to the dormant market prevailing. The Mond Nickel Company operated at a reduced rate for the greater part of the year, while the International Nickel Company did not operate until September when three furnaces were blown in. The silver-cobalt ores and residues exported contained a further small amount from which it was estimated 30,208 pounds of copper would be recovered. The South Ontario silver smelters also produced and sold 22,553 pounds of copper sulphate, the copper contents of which (or 25 per cent) was included in the total for Ontario.

The province of Quebec in 1921 produced 352,308 pounds, but during 1922, the Weedon Mine was idle, and the only shipment reported was some cinder resulting from the treatment of sulphur-copper ores in the manufacture of sulphuric acid. This shipment contained 81,321 pounds of copper and was not included as 1922 production.

Manitoba did not produce any copper during the year. In 1920 the Mandy mine shipped 7,535 tons of ore to Trail, which had been mined during 1919. With the difficulties of transportation, high freight rates, and a greatly curtailed market, the economic production of copper in the province was impossible.

The production from British Columbia declined during the period to 32,432,521 pounds valued at \$4,340,120 as against 34,447,127 pounds valued at \$4,306,580 in 1921. The output included 29,589,021 pounds as blister or converter copper, and copper in copper sulphate, and 2,843,500 pounds, estimated as recovered from ores exported.

In former years, the Yukon Territory produced a few hundred thousand pounds from copper ores, but at the time of writing no ores had been reported as shipped for treatment.

Throughout the twelve months the price of copper was fairly uniform around 13 cents and for the period averaged 13.382 cents per pound. Considered in relation to the prices obtaining during the first nine months of 1920 at the end of which time the price broke sharply, the drop was about five cents per pound. Comparative New York and London prices for each month of the past two years are given in tabular form below.

The imports and exports of copper and copper products as compiled from the Reports on the Trade of Canada here follow:—

Copper Production in Canada by Provinces, 1921-1922

Province	1921		1922	
	Output in lbs. of copper	Value	Output in lbs. of copper	Value
		\$		\$
British Columbia.....	34,447,127	4,306,580	32,432,521	4,340,120
Ontario.....	12,821,385	1,602,930	10,888,882	1,457,150
Quebec.....	352,308	44,045		
Total.....	47,620,820	5,953,555	43,321,403	5,797,270

Prices of Copper (Electrolytic)

	New York		London	
	1921	1922	1921	1922
January.....	12.597	13.465	79.119	72.321
February.....	12.556	12.864	75.925	66.125
March.....	11.976	12.567	71.190	65.739
April.....	12.438	12.573	71.786	64.028
May.....	12.742	13.111	74.298	66.554
June.....	12.697	13.575	75.682	69.333
July.....	12.170	13.654	75.286	70.321
August.....	11.634	13.723	72.705	69.932
September.....	11.948	13.748	72.295	70.917
October.....	12.673	13.632	73.476	70.693
November.....	13.035	13.598	74.386	70.216
December.....	13.555	14.074	74.525	70.132
Average.....	12.502	13.382	74.223	68.859

NOTE.—New York quotations in cents per pound. London quotations in pounds per long ton.

Imports into Canada and Exports of Copper, 1921 and 1922

Item	1921		1922	
	Quantity	Value	Quantity	Value
		\$		\$
<i>Exports—</i>				
Copper, fine in ore, etc. tons	5,255	1,029,220	9,532	1,730,681
Blister Copper	16,539	5,167,915	16,020	4,204,136
Copper in pigs, bars, sheets. "	1,627	497,383	3	1,247
Copper, old and scrap	785	161,378	1,662	334,673
Copper wire and cable		569,618		208,683
Copper manufactures				53,569
Total		7,425,544		6,532,989
<i>Imports—</i>				
Copper in bars or rods when imported by manufacturers of trolley, telegraph and telephone wires, electric wires, and electric cables for use only in the manufacture of such articles in their own factories. cwt.	104,785	2,278,883	234,031	3,334,793
Copper in bars or rods, in coil or otherwise, in lengths of not less than six feet unmanufactured, n.o.p. "	7,804	140,422	4,450	80,701
Copper in blocks, pigs or ingots	925,452	135,563	1,145,463	159,071
Copper, old and scrap	3,079	37,955	14,709	205,447
Copper ore and concentrates	27,500	48,015	2	121
Copper in strips, sheets or plates, not polished, polished or coated	18,338	426,954	22,938	497,013
Copper tubing in lengths of not less than six feet and not polished, bent, or otherwise manufactured	788,079	190,907	898,076	212,061
Copper wire, plain, tinned or plated. "	109,739	37,767	102,475	26,331
Total		3,302,366		4,516,138

GOLD

The total production of gold in 1922 amounted to 1,230,985 fine ounces valued at \$25,446,717 as against 926,329 fine ounces valued at \$19,148,920 in 1921. Of the total 1922 production 68,737 ounces or 5.6 per cent was derived from placer mining in the Yukon and British Columbia; 1,017,566 ounces or 82.7 per cent was in the form of bullion; 16,359 ounces or 1.3 per cent was contained in lead bullion, blister copper and other copper mattes, and 128,323 ounces or 10.4 per cent was estimated as recovered from ore, concentrates and residues exported.

Ontario was again the leading producer, the output being 999,848 ounces or 81.22 per cent of the total for Canada. As compared with the previous year the production showed an increase amounting to 291,635 ounces or 41.2 per cent. Except for some 600 ounces recovered from ores and mattes exported, the whole Ontario production was from the mines of the Porcupine and Kirkland Lake areas. The outputs were: Porcupine area, 894,680 ounces, from the Hollinger, Dome and McIntyre Mines; Kirkland Lake area, 104,479 ounces recovered by the Wright Hargreaves, Tech Hughes, Lake Shore, Kirkland Lake Gold, Kirkland Proprietary, and Montreal-Ontario mines.

The mines of Kirkland Lake were forced to close down for a few weeks in the fall as a result of the disastrous forest fire which cut the power line.

British Columbia also showed a very creditable increase during 1922, much of which should be credited to the successful development of the mines in the northwestern section of the province. The Hedley Gold Mining Company also

resumed operations, as did the Nugget Group. Placer mining showed an improvement both in the Caribou and Atlin areas. The production from all sources during 1922 was 175,558 ounces as against 150,592 in 1921, an increase of 26,966 ounces or 17·8 per cent.

Yukon Territory production continued to decline; dropping to 54,370 ounces in 1922 as against 65,994 ounces in 1921, decrease of 17 per cent. This output was mainly recovered within a fifty-mile radius of Dawson by dredging operations although individual prospectors mined considerable quantities using small hydraulic plants.

Nova Scotia, Manitoba and Alberta again produced small quantities of gold bullion, while Quebec, owing to the idleness of the sulphur-copper and lead mines, was not a producer. The detail is shown in the following table:—

Comparative Table of Production of Gold by Provinces during 1921 and 1922

Province	1921			1922			+ -	
	Fine	Value	Per cent of Total Production	Fine	Value	Per cent of Total Production	Increase	or Decrease
	Ozs.	\$		Ozs.	\$		Quantity	Per cent
Ontario.....	708,213	14,640,062	76·45	909,848	20,668,692	81·22	+291,635	+41·2
British Columbia.....	150,592	3,117,147	16·14	175,558	3,629,106	14·26	+26,966	+17·8
Yukon.....	65,994	1,304,217	7·13	54,370	1,123,927	4·41	-11,624	-17·6
Quebec.....	635	13,127						
Manitoba.....	207	4,279	0·28	156	3,225	0·11	-51	-9·1
Nova Scotia.....	439	9,075		1,041	21,519		+602	
Alberta.....	49	1,013		12	248		-37	
Canada.....	926,329	19,148,920	100·00	1,230,985	25,446,717	100·00	+304,656	+31·0

Production of Placer Gold in the Yukon Territory, 1921-1922

(Quantities in crude ounces)

Month	Dawson		Whitehorse		Total	
	1921	1922	1921	1922	1921	1922
January.....	813·77	18·90			813·77	18·90
February.....	621·16	815·64	1·06		622·22	815·64
March.....		295·52	22·85		22·85	295·52
April.....	34·49	82·30	1·69		36·18	82·30
May.....						
June.....	14,713·60	14,360·08	3·40		14,717·00	14,360·08
July.....	13,585·40	10,288·07			13,585·40	10,288·07
August.....	14,725·05	8,062·47	17·43		14,742·48	8,062·47
September.....	11,739·43	15,552·16	34·30	83·13	11,773·73	15,635·29
October.....	22,034·25	11,681·89	71·75	16·00	22,106·00	11,697·89
November.....	3,152·44	4,550·36	30·75	62·68	3,183·19	4,613·04
December.....	791·75	2,092·53			791·75	2,092·53
Total.....	82,211·34	67,799·92	183·23	161·81	82,394·57	67,961·73

Receipts at the Royal Mint, 1921 and 1922

Source	1921			1922		
	Gross Weight	Precious Metal Content		Gross Weight	Precious Metal Content	
		Fine Gold	Fine Silver		Fine Gold	Fine Silver
Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	Ozs.	
Yukon.....				21.27	16.363	3.55
Alberta.....	29.64	26.514	2.15	16.91	12.146	3.26
British Columbia.....	67.16	37.977	22.36	68.24	38.941	22.09
Manitoba.....	359.33	246.287	44.08	213.47	156.345	20.15
Nova Scotia.....	497.81	433.383	25.14	1,200.07	1,041.504	85.49
Ontario.....	863,732.32	671,762.885	116,069.32	1,234,988.20	979,407.371	160,335.07
Vancouver Assay Office.....	164,807.09	140,951.867	19,177.72	126,577.56	102,202.163	18,325.66
Jewelry and scrap.....	24,836.66	4,806.097	6,929.88	13,777.63	4,070.835	2,497.76
Foreign.....				345.22	260.641	67.67
Total.....	1,054,330.01	818,265.01	142,270.65	1,377,208.57	1,087,206.306	181,360.70

Imports into Canada and Exports of Gold, 1921 and 1922

	Imports		Exports	
	1921	1922	1921	1922
	\$	\$	\$	\$
Bullion or fringe gold.....	62,519	38,939		
Gold and silver sweepings.....	2,771	5,471		
Gold bearing quartz, dust, nuggets and bullion obtained from operators.....			2,550,524	3,953,938

IRON ORE

The shipments of iron ore from Canadian mines declined to a low ebb during 1922, the only iron ore mined being some 1,255 tons which came from British Columbia and was shipped to Seattle, Washington, U.S. In Ontario shipments of a few thousand tons of briquettes were made by the Moose Mountain Company, Limited, but the Magpie mine of the Algoma Steel Corporation was idle throughout the period, shipping only some 300 tons to Sault Ste. Marie. The total shipments from the mines was 5,859 tons valued at \$29,725.

Imports of iron during the period amounted to 887,360 tons valued at \$2,259,259 as against 661,168 tons valued at \$2,109,094 in 1921. Exports as given in Reports on the Trade of Canada in 1922 were 2,417 tons valued at \$14,091, as against 4,261 tons valued at \$13,373 in 1921.

During the year, the production of iron ore in the Province of Ontario was the subject of an important conference held at the Department of Mines, Toronto. The discussion covered the following agenda.

1. The extent of the iron ore deposits of Ontario. Are they sufficient to sustain a native blast furnace industry of importance?

2. (a) The applicability of magnetic concentration methods for low grade magnetites, and subsequent briquetting or nodulising.

(b) Processes of increasing the metallic content of siliceous hematites.

(c) The reduction and nodulising of siderites.

3. Are all or any of the above or other methods of beneficiation within permissible limits of cost?

4. How far can a market be found in Ontario for beneficiated Ontario ores?

5. Is there a market for more than the present pig-iron product of Ontario? If so, where?

6. Can the problem be attacked by adapting a method of reduction to low grade ores, rather than by treating the ores so as to make them amenable to present blast furnace practice?

7. Any aspects of the question not enumerated above.

The following resolution dealing with the agenda was adopted by the conference.

1. The known and probable ore reserves now determined can provide sufficient beneficiated ore to sustain our blast furnaces; and it seems likely that intensive exploration will disclose commercial deposits of ore that will not require beneficiation.

2. The present methods of beneficiation are satisfactory, and both nodulising and briquetting (or sintering) are recommended.

3, 4, 5. A conclusion on these questions is beyond the scope of the present conference, and they should be considered by a special committee or commission, the appointment of which by the Government the conference recommends, the commission to be composed of a geologist, a blast furnace operator or metallurgist, and a representative of transportation interests.

NOTE.—Since going to press a shipment of 297 tons of iron ore was reported as having been made from Baie St. Paul, Quebec.

PIG-IRON

The total production of pig-iron in 1922 was 383,057 tons as compared with an output of 594,354 tons in the previous year. The decrease was therefore 211,297 tons or 35.5 per cent. The maximum production in the past year occurred in March, when 41,733 tons was reported. The minimum output of 23,363 tons was reported for May and the production during the following four months was less than 32,000 tons each. The output during the last quarter was only 421 tons less than that of the first three months of the year and exceeded the second quarter by 22,370 tons and the third quarter by 23,266 tons. The average monthly production throughout the year was 31,921 tons and the output during December exceeded the average by 12.4 per cent. The production of ferro-alloys was well maintained and amounted to 20,749 tons as compared with 22,493 tons during the previous year. An output of 28,173 tons was reported for 1920 and 48,601 tons in the maximum year of 1919.

The following table shows the production of pig-iron by grades, and ferro-alloys during 1922:—

Pig-Iron and Ferro-Alloys Production

(Tons of 2,240 lbs.)

Total for the twelve months ending December, 1922

	In Blast Furnaces		In Electric Furnaces		Total Production
	For own use	For sale	For own use	For sale	
<i>Pig Iron—</i>					
Basic.....	252,870	430			253,300
Foundry.....	303	99,134			99,437
Malleable.....		30,216			30,216
Castings.....				104	104
Total Pig Iron.....	253,173	129,780		104	383,057
Total Ferro-Alloys.....	4,389	342		16,018	20,749

STEEL INGOTS AND CASTINGS

The total steel production during 1922 was 485,643 tons, while 667,484 tons was produced in 1921. The decline during the year was 181,841 tons or 27.3 per cent. Of these quantities 463,113 tons of steel ingots was reported in 1922 as compared with 645,075 tons produced in the previous year, a decrease of 181,962 tons or 28.2 per cent. The production of direct steel castings on the other hand was slightly increased, as 22,530 tons was produced as compared with 22,409 tons in 1921.

There was a considerable improvement in the production of steel during the last six months as compared with the output of the first half of the year. The total steel production for the six months ending June 30 was 177,080 tons, while 308,140 tons was produced during the last half of the year. This was an increase of 131,060 tons or 74 per cent. The production of open-hearth basic ingots for further use indicated a similar trend in that the monthly average for the first six months of 1922 was 27,938 tons as compared with an average of 49,197 tons during the last half of the year.

Total Production of Steel Ingots and Castings

(Tons of 2,240 lbs.)

For the twelve months ending December, 1922

	For own use	For sale	Total Production
<i>Steel Ingots—</i>			
Open hearth—Basic.....	462,795		462,795
Acid.....			
Bessemer.....	7	18	25
Electric.....	168	125	293
Total Steel Ingots.....	462,970	143	463,113
<i>Steel Castings—</i>			
Open hearth—Basic.....	1,423	7,318	8,741
Acid.....			
Bessemer.....	61	3,051	3,112
Electric.....	979	9,698	10,677
Total Direct Steel Castings.....	2,463	20,067	22,530
Grand Total.....	465,433	20,210	485,643

LEAD

Notwithstanding the general decline in prices during 1920 and 1921 and the first six months of 1922, the quantity of lead recovered by the Canadian smelters and contained in shipments exported showed a notable increase. The price of lead on the Montreal market which was about 6.472 cents in January had increased by June to 6.906 cents and by December to 8.637 cents. Of the two producing provinces, British Columbia made the most notable increase, while normal production was maintained by Ontario.

The Dominion production from all sources amounted to 94,170,469 pounds which at the average Montreal price for the year or 7.210 cents per pound was valued at \$6,789,690. Compared with 1921, the production showed an increase of 41.2 per cent in quantity above the 66,679,592 pounds produced in that year and 77.3 per cent above the value recorded, namely \$3,828,742. The lead production

included the refined lead and pig-lead produced in Canada from the treatment of domestic ores together with the lead estimated as recovered from ores exported to the United States.

In 1922 production was comprised of 87,083,153 pounds of lead contained in lead bullion produced at Trail; 2,860,716 pounds pig-lead from the lead smelter at Galetta, Ont., and the estimated quantity of 5,563,600 pounds recovered from exported ores. These exported ores were principally from the east and west Kootenays and the Yukon Territory. In British Columbia the year was marked by increased activity in the silver-lead mines of the east and west Kootenays, while the developments made in the Keno area of the Yukon during past years have been increased, indicating important resources of silver-bearing lead ore.

The record of lead recoveries made from domestic and imported ores are shown below, together with a record of pig and refined lead produced.

Lead Production in Canada, 1920, 1921 and 1922

	1920	1921	1922
Smelter production from Canadian ores and recoverable lead in ores exported.....	35,953,717	66,679,592	94,170,469
Total production of refined lead in Canada including the lead contained in imported ores.....	28,720,030	60,949,793	81,412,716

Imports into Canada and Exports of Lead, 1921 and 1922

	1921		1922	
	Quantity	Value	Quantity	Value
	Lb.	\$	Lb.	\$
<i>Exports—</i>				
Lead, contained in ore.....	6,253,700	256,834	10,941,800	550,088
Pig lead.....	23,779,700	992,485	41,481,900	1,877,050
Total.....	30,033,400	1,249,319	.....	2,427,138
<i>Imports—</i>				
Lead bars and sheets.....	179,818	10,552	263,612	17,957
Lead, pig and block.....	922,989	44,663	1,932,881	101,942
Lead pipe.....	55,429	3,116	96,716	6,458
Shots and bullets.....	12,502	844	10,324	4,173
Manufacturers of lead, n.o.p.....	.....	100,541	.....	199,330
Total.....	1,161,738	159,916	.....	329,800

MOLYBDENUM

Of the many producers of molybdenum who operated during the war, none have reported any production during the past three years. During 1921 a total of 1,700 pounds of molybdenum was exported to the United States this shipment being made from stocks left over from previous years. During the year 1922, no exports or imports were reported.

NICKEL

Of the important metals for which Canada is famous, nickel has probably suffered the severest decline. This is entirely due to the overstocked condition of the world's nickel markets and to the slowness with which the large stocks held by all the warring countries have been absorbed. Owing to its extensive use as a war metal, nickel has moved towards normal even more slowly than the other metals. The total Dominion output in 1922 was 17,496,490 pounds or 28.5 per cent of the production during 1920 which amounted to 61,335,706 pounds. The selling price of nickel has to some extent been lowered although quotations in New York have ranged as high as forty-four cents per pound for electrolytic with outside markets at 32 to 34 cents. The sales during the year have been increased with a more active demand. During August, the International Nickel Company commenced shipping matte to Port Colborne, and the Mond Company which had produced at a reduced rate, increased its production and shipped its entire stock of matte towards the end of the year. It was expected that the refinery in Wales would be running at full capacity by the end of 1922. The British America Nickel Corporation plants were inactive throughout the entire period. The total output from the Sudbury smelters amounted to 17,324 tons of matte which contained 10,841,647 pounds of copper and 17,355,056 pounds of nickel, the average contents of metals in the matte being about 32 per cent copper and 50 per cent nickel. The year's output included as usual, nickel metal produced as such from the smelting of silver-cobalt ores and some nickel contained in oxides and nickel salts. The nickel from these sources amounted to 141,434 pounds, all produced by the south Ontario smelters.

Of the two Canadian nickel refineries, the one at Deschênes owned by the British America Nickel Corporation was closed down, with the exception of experimental work carried on. The International Nickel Company's plant at Port Colbourne, resumed operations in September and treated 10,340 tons of matte during the last period of the year. As usual the Mond output was exported to Wales for refining. A small quantity of matte from the International Nickel Company's refinery at Port Colborne, was shipped to the United States from which, together with accumulated residues, there was produced a small quantity of metals of the platinum group.

The exports of nickel metal, nickel-copper matte, etc., during 1921 and 1922 are shown below.

Production in Canada and Exports of Nickel, 1921-1922

Items	1921		1922	
	Quantity	Value	Quantity	Value
		\$		\$
<i>Production—</i>				
Nickel contained in matte..... Lb.	19,256,900		17,335,056	
Nickel from Cobalt ores..... "	36,100		141,434	
	19,293,060	6,752,571	17,496,490	6,123,771
<i>Exports—</i>				
Nickel, fine..... "	4,974,500	1,684,451	16,767,600	2,536,347
Nickel contained in matte..... "	8,064,600	1,418,490	14,449,700	4,287,941
	12,859,100	3,102,943	31,217,300	6,824,288

PLATINUM

Previous to 1919 no attempt was made in Canada to recover metals of the platinum group. The principal source of these metals is believed to be the nickel-copper ores from the Sudbury district, the matte from which was previously exported for refining either in the United States or Wales. Both the International Nickel Company and the Mond Nickel Company exported their products in the form of residues or nickel-copper matte containing precious metals. These latter are recovered at the refineries in New Jersey and Wales respectively. No data regarding recovery of platinum metals at Swansea had come to hand at the time of writing, and as a consequence it was somewhat difficult to determine the quantity of platinum contained in ores produced in 1921. The British America Nickel Corporation, which commenced operating its refinery at Deschenes, Quebec, early in 1920, but which was closed down early in 1921, will be in a position to recover platinum and related metals when operations are resumed. A few ounces of native platinum are won every year from the alluvial sands in the Tulameen district of British Columbia, but to date no large scale working of these deposits has been attempted. Taking no account of the platinum contents of the Mond matte which was exported to Wales, the platinum production from Canadian ores in 1922 amounted to 138 ounces. Other associated metals were Palladium, 301 ounces; Iridium, Rhodium, Ruthenium, Osmium 125 ounces. The Ontario output was recovered in New Jersey by the International Nickel Company treating mattes and residues from the Port Colborne refineries. The total value for the above quantities was \$38,776 as against 940 crude ounces with a value of \$69,867 in 1921.

The exports and imports as compiled from the Reports of the Trade of Canada were as follows:—

Imports into Canada and Exports of Platinum, 1921 and 1922

	1921		1922	
	Quantity	Value	Quantity	Value
	Ozs.	\$	Ozs.	\$
<i>Exports—</i>				
Contained in concentrates.....	705	50,697	35	3,626
Platinum, old and scrap.....	111	6,982	151	13,328
Total.....	816	57,679	186	16,954
<i>Imports—</i>				
Platinum retorts.....		4,342		887
Platinum wire, and in bars, strips, etc.....		69,516		91,425
Platinum crucibles.....		3,785		3,976
Total.....		73,301		96,288

SILVER

During 1922, the production of silver in Canada showed a considerable increase over the record for the previous year. This was mainly due to the large increase in production from the British Columbia mines, and in part to a creditable output from the Cobalt district.

The price of silver which stood at about 65½ cents per ounce in January had risen in June to 71.149 cents. The quotations then gradually declined until in December silver was quoted in New York at 63.805 cents per ounce.

An important feature of the achievement of the year especially in Ontario was found in the fact that costs of mining the ore and recovering the silver had declined to a considerable extent. In British Columbia the successful development of the Premier Mine was an important factor in the increased production.

The total production for the Dominion during 1922 was 17,611,646 fine ounces valued at \$11,891,560 as compared with 13,543,198 fine ounces valued at \$8,485,355 in 1921, an increase of 30.04 per cent in quantity and 40.1 per cent in value.

Of the total production, 9,787,069 ounces or 55.57 per cent was produced as refined bullion, 2,844,055 ounces or 16.15 per cent was contained in blister copper and lead bullion and 4,980,522 ounces or 28.2 per cent was estimated as contained in gold bullion and recoverable from ores exported.

The production in Ontario was 10,698,522 fine ounces as against 9,761,607 fine ounces in 1921 and was derived as in past years mostly from the silver-cobalt ores of the Cobalt and adjacent districts. Of the total Ontario production, 7,945,195 ounces or 74.3 per cent was recovered in the mills and reduction works of Cobalt; 1,841,874 ounces or 17.2 per cent was recovered in the south Ontario smelters; 175,779 ounces or 1.6 per cent was the production from the gold mines and the nickel refineries and 735,674 ounces or 6.9 per cent was estimated as recovered from ores and residues, etc., exported for treatment.

The British Columbia production was 6,279,486 fine ounces as against 3,350,357 fine ounces in 1921. This production included 2,362,451 ounces or 37.6 per cent contained in lead bullion; 401,099 ounces or 6.4 per cent contained in blister or converter copper and 3,514,763 ounces or 56.0 per cent the estimated recoveries from ores exported. There was also some 1,173 ounces produced from milling ores and placer workings during the year.

The production from the Yukon continued to increase. In 1920 the output totalled 15,330 ounces; in 1921 it was 393,617 ounces, and in 1922 it amounted to 633,533 ounces, of which all but 12,233 ounces estimated as contained in placer gold, came from the lead ores of the Keno district, which were exported for treatment.

Quebec did not produce any silver, owing to the idleness of the sulphur-copper and lead mines of the Eastern Townships. Manitoba and Nova Scotia were each credited with a few ounces contained in gold bullion produced.

Average Monthly Prices of Silver, 1921 and 1922

Month	1921		1922	
	Average Price		Average Price	
	New York	London	New York	London
	Cents per oz. .999	Pence per oz. .925	Cents per oz. .999	Pence per oz. .925
January	65.950	39.985	65.450	35.035
February	59.233	34.745	65.290	33.891
March	56.023	32.479	64.440	33.269
April	59.337	34.250	66.575	34.080
May	59.810	34.165	71.154	36.023
June	58.510	34.071	71.149	35.900
July	60.260	37.481	70.245	35.644
August	61.597	38.096	69.417	34.957
September	66.160	40.082	69.515	35.305
October	70.970	41.442	68.015	34.498
November	68.234	38.750	65.177	32.882
December	65.760	35.645	63.805	31.383
Average for 12 months	62.654	36.841	67.521	34.406

Production of Silver in Canada, 1921 and 1922

Province	1921			1922		
	Quantity	Value	Per cent of total production	Quantity	Value	Per cent of total production
	Ozs.	\$	Per cent	Ozs.	\$	Per cent
Ontario.....	9,761,607	6,116,037	72.1	10,098,522	7,223,749	60.7
British Columbia.....	3,350,357	2,099,133	24.7	6,279,486	4,239,972	35.7
Quebec (in ores exported).....	38,084	23,861	0.3			
Yukon Territory (contained in placer gold and in ores exported).....	393,092	246,288	2.9	633,533	427,768	3.6
Manitoba.....	33	20		20	13	
Total.....	13,543,198	8,485,355	100.0	17,611,646	11,891,560	100.0

¹ Contains 25 ozs. from Nova Scotia.

² Contains 85 ozs. from Nova Scotia.

Imports into Canada and Exports of Silver, 1921-1922

	1921		1922	
	Oz.	\$	Oz.	\$
<i>Exports—</i>				
Silver contained in ore concentrates, etc.....	2,774,918	1,655,186	6,471,159	5,281,395
Silver bullion.....	10,384,909	6,544,477	10,930,538	7,402,633
Total.....	13,159,827	8,199,663	17,401,697	11,684,028
<i>Imports—</i>				
Silver bullion in bars.....		581,861		657,760
Sterling silver.....		174,788		178,223
Total.....		756,649		835,983

ZINC

While the record for 1921 far exceeded that of 1920, the production of zinc during 1922, again showed an increase in comparison with the record for the previous year. The Canadian production in 1922 amounted to 56,397,500 pounds which at the average St. Louis price for the year of 5.716 cents per pound was worth \$3,223,681, as against 53,089,356 pounds valued at \$2,471,310 in 1921. These data show an increase of 6.2 per cent in quantity and an increase of 30.4 per cent in value. Of the total Canadian production of 56,397,500 pounds, the refined zinc produced by the Trail smelters amounted to 56,290,000 pounds and a total of 141,434 pounds was estimated as recovered from ore and concentrates shipped to United States smelters (25 per cent of the zinc contents being allowed for smelter losses). The production in 1921 included 52,988,000 pounds of refined zinc and 101,356 pounds estimated as recovered from exported ores. As in other years, the production was derived entirely from British Columbia. Quebec, which formerly produced about a million pounds per year, did not report the shipment of a single consignment of zinc ore or concentrates.

Zinc ores and concentrates were formerly exported at heavy cost in freight and duty to United States smelters. The operators were recompensed for the zinc contents but lost valuable amounts of silver, and were penalized for any lead present. On the other hand, lead ores and concentrates containing consider-

able zinc proved very refractory when treated in the lead smelters in Canada, and as a result mine operators suffered a penalty per unit of zinc in their ores. Under these conditions zinc mining was handicapped and could not flourish except under such conditions as obtained in the late war. By the introduction of improvements in the electrolytic process carried on by the Consolidated Mining and Smelting Company, it has been found possible to offer a schedule of smelter rates under which the mine operator will be enabled to market zinc ores and concentrates and receive payment for a considerable portion of the precious metal contents in addition to the zinc. While zinc contained in lead ores may continue to be a loss, the penalty will be lowered and it is expected that the lead-zinc industry will benefit materially.

"For straight zinc ores the schedule provides a sliding scale of percentages of the zinc paid for increasing with the zinc tenor of the ore, with payment of zinc at 3.6 per cent of the London quotation of the week of arrival. In 30 per cent ore the smelter will pay for 60 per cent of the zinc and this ratio increases until a maximum of 85 per cent of the zinc is paid for in ore running 50 per cent zinc or over. In addition to the payment for the zinc the schedule also provides for payment of 80 per cent of the gold, 80 per cent of the silver, and for 80 per cent less 5 units of the wet lead. The recovery of those three metals will be in the smelting of residues after leaching out the zinc and a scale of smelting charges is provided decreasing as the zinc tenor of the ore increases and the percentage of residues lessens."

The range of average yearly prices for the last six years on the St. Louis Market, as published by the *Engineering and Mining Journal*, were as follows: 1917, 8.730 cents; 1918, 7.890 cents; 1919, 6.988 cents; 1920, 7.671 cents; 1921, 4.655 cents, and 1922, 5.716 cents. The New York quotations are usually about one-half a cent higher due to the difference in freight rates.

The average monthly prices of zinc on the Montreal and St. Louis markets are shown in the accompanying table, supplied through the courtesy of the Consolidated Mining and Smelting Company:—

Zinc Prices—1921 and 1922

(In cents per pound)

Months	1921		1922	
	Montreal	St. Louis	Montreal	St. Louis
January.....	6.561	5.413	6.472	4.691
February.....	6.607	4.928	6.211	4.485
March.....	6.686	4.737	6.288	4.658
April.....	6.588	4.747	6.531	4.906
May.....	6.809	4.848	6.691	5.110
June.....	6.556	4.421	6.906	5.346
July.....	6.311	4.239	7.274	5.694
August.....	6.126	4.186	7.734	6.212
September.....	6.19	4.235	7.864	6.548
October.....	6.454	4.605	7.274	6.840
November.....	6.55	4.665	8.639	7.104
December.....	6.673	4.837	8.637	6.999

* Extracted from Canadian Mining Journal.

Imports into Canada and Exports of Zinc

		Twelve Months ending December 31			
		1921		1922	
			\$		\$
<i>Imports—</i>					
Zinc dust.....	Lbs.	434,981	46,440	313,598	27,376
Zinc in blocks, pigs, bars and rods.....	"	36,248	2,613	51,641	3,919
Zinc in sheets and plates.....	"	2,746,753	244,862	3,845,449	296,076
Zinc seamless drawn tubing.....	"			54	14
Zinc spelter.....	"	1,110,744	56,683	1,060,283	67,737
Zinc manufactures of n.o.p.....	"		53,946		78,398
Total zinc and its products.....	"		404,544		473,520
<i>Exports—</i>					
Zinc ore.....	Lbs.	52	1,293	40	1,095
Zinc spelter.....	"	12,828	1,336,389	28,519	3,054,644
Total zinc and its products.....			1,337,682		3,055,739

NON-METALLICS

ABRASIVES, NATURAL

CORUNDUM.—The corundum deposit at Craigmont, Renfrew county, owned by the Corundum Limited, was inactive throughout the year and no shipments were reported of the grain product. In the previous year, 403 tons of grain corundum valued at \$55,965 were exported to United States.

GRINDSTONES, PULPSTONES AND SCYTHESTONES.—The production of grindstones in Canada in 1922 from the quarries in the provinces of Nova Scotia and New Brunswick amounted to approximately 1,200 tons valued at \$62,000. The shipments reported for the corresponding period of 1921 were 1,281 tons at \$64,067.

TRIPOLITE.—The deposit of tripolite at Silica Lake, Colechester county, Nova Scotia was operated by the Oxford Tripoli Company for five months of 1922. The total sales for the year amounted to 219 tons with a value of \$5,781, as compared with 341 tons at \$11,268 in 1921.

Imports into Canada and Exports of Abrasives, 1921 and 1922

		1921		1922	
		Quantity	Value	Quantity	Value
			\$		\$
<i>Imports—</i>					
Grindstones.....			448,055		319,941
Burrstones in blocks, etc.....	No.	668	4,844	400	910
Emery in bulk, crushed or ground.....			44,490		41,943
Emery and corborundum wheels and manufactures.....			197,049		209,356
Pumice and pumice stone, ground.....			21,528		26,405
Iron sand or globules for polishing and sawing.....			13,723		11,820
Sandpaper, emery paper, etc.....			252,804		270,231
Artificial abrasives.....			74,083		163,542
<i>Exports—</i>					
Grindstones, manufactured.....			24,915		17,018
Stone for the manufacture of grindstones..	Tons	91	2,686		
<i>Abrasives—</i>					
Natural, n.o.p.....	Cwt.	34,285	83,773	52,752	128,934
Artificial, crude, including carborundum..	"	139,146	522,531	266,526	1,299,818
Artificial, made up into wheels, stones, etc.....			18,752		14,650

ACTINOLITE

Shipments of actinolite (to the United States) in 1922 amounted to 50 tons valued at \$345, as compared with 78 tons at \$975 in 1921. Sales during this year were made from milled stock on hand as no mining or milling operations were reported. The average price obtained during the period under review was \$11.50 per ton, while the quotation in the previous year was \$12.50 a ton.

Deposits in the townships of Elzevin and Kaladar in Hastings and Addington counties, Ontario, have been the only producers of this commodity in Canada. The centre of this industry is at Actinolite, where the Actinolite Manufacturing Company owns and operates a grinding mill.

Actinolite is used as an ingredient for coal-tar roofing compounds, care being taken in the grinding so as not to destroy the fibre.

ARSENIC

The production of arsenic in Canada in 1922 amounted to 2,576 tons valued at \$321,037, which was an increase of 73 per cent in quantity, but only 37 per cent in value over the shipments for 1921. Approximately four-fifths of this quantity was produced in the smelting of silver-cobalt-nickel ores of the Cobalt district. The Hedley Gold Mining Company in British Columbia reported some 500 tons of this commodity as having been recovered from arsenical gold concentrates shipped to the Tacoma smelter.

The price of arsenic rose from 7 cents in March to 13½ cents in December with an average of 8.5 cents for the year, as against 8.85 cents in the previous year. The increase in quantity was due to the large demand for arsenical insecticides to combat the boll weevil in the cotton districts of southern United States.

Arsenic is generally marketed in the form of white arsenious oxide (As_2O_3) and is used principally in the manufacture of insecticides, (Paris green and lead arsenate), although the glass and tanning industries consume considerable quantities.

Production, Imports and Exports of Arsenic, 1921 and 1922

	1921		1922	
	Quantity	Value	Quantity	Value
<i>Production—</i>		\$		\$
From arsenical concentrates..... Tons			518	21,097
White arsenic..... "	1,491	233,763	2,058	299,940
	1,491	233,763	2,576	321,037
<i>Imports—</i>				
White arsenic..... Lb.	1,847	230	441,168	32,520
Sulphide of arsenic..... "	185,685	26,348	525,246	39,264
Arseniate of soda..... "	11,993	3,002	7,961	1,402
<i>Exports—</i>				
Arsenic, metallic..... Tons			222	5,238
Arsenic, n.o.p..... "	767	108,535	1,367	198,005

ASBESTOS

During the first six months of 1922, the asbestos market was supplied principally by the large stocks of fibre on hand from the previous year. In July, the demand for short grades increased and brought about a renewal of activity in the industry. The market for longer grades, (principally spinning fibre) improved towards the close of 1922.

The total shipments reported for the year were 136,657 tons valued at \$4,664,106, an increase of 47 per cent or 43,896 tons in quantity, and a decrease of approximately \$242,124 in value.

The asbestos rock mined during the year amounted to 2,311,567 tons, of which 1,915,019 tons or 83 per cent was milled. As compared with the quantity raised in 1921, namely 2,063,821 tons, the percentage of increase was 12 per cent.

A reduction in the royalty on asbestos from 5 per cent on the gross value of asbestos shipped, to 2½ per cent was passed by order in council on October 21, 1922, and was made retroactive to January 1, 1922.

Output, Sales and Stocks of Asbestos in Canada, 1921 and 1922

Classification	Total output	Sold or Shipped			Quantity in stock on hand at end of period
		Quantity	Total sales value at mill	Average value per ton	
	Tons	Tons	\$	\$	Tons
1922					
Crude No. 1.....	668	290	167,633	578.04	1,437
Crude No. 2.....	1,571	922	294,781	319.71	2,155
Fiberized Crude.....	120	328	64,506	196.06	43
Spinning Stocks.....	9,486	6,032	1,203,264	199.48	8,865
Shingle Stocks.....	12,894	9,047	760,319	84.04	8,242
Mill Board Stocks.....	20,764	22,029	651,129	29.56	3,075
Paper Stocks.....	30,340	37,428	1,029,481	27.50	7,873
Paper Fillers.....	23,527	30,479	366,050	12.01	2,696
By-Products (asbestos sand, finish, floats).....	31,378	30,102	126,943	4.22	3,258
Total.....	136,748	136,657	4,664,106	34.13	37,224
1921					
Crude No. 1.....	653	222	273,007	1,229.76	879
Crude No. 2.....	1,741	563	334,134	593.50	1,840
Fiberized Crude.....	688	141	59,350	420.92	1,043
Spinning Stocks.....	9,914	4,969	1,272,700	256.12	6,236
Shingle Stocks.....	19,325	10,990	1,031,634	93.87	11,530
Mill Board Stocks.....	3,788	3,242	222,334	68.58	1,893
Paper Stocks.....	32,595	26,944	1,263,266	46.88	11,730
Paper Fillers.....	27,199	20,262	308,379	15.22	10,396
By-Products (asbestos sand, finish, floats).....	27,474	25,428	141,419	5.56	6,741
Total.....	123,377	92,761	4,906,230	52.89	52,288

Imports into Canada and Exports of Asbestos, 1921 and 1922

	1921		1922	
	Tons	\$	Tons	\$
<i>Imports—</i>				
Asbestos in any form other than crude, and all manufactures of, n.o.p.....		575,153		476,408
<i>Exports—</i>				
Asbestos.....	63,340	5,465,311	105,114	5,993,570
Asbestos sand and waste.....	22,054	215,961	56,885	502,223
Asbestos manufactures.....		261,274		95,826
Total.....		5,942,546		6,651,619

BARYTES

Sales of ground barytes in Canada during 1922 amounted to 289 tons with a value of \$9,537, as compared with 270 tons worth \$9,567 in the preceding year. These shipments were made from the mill operated by the Brandram-Henderson, Ltd., in connection with the Johnston Barytes mine at Lake Ainslie, Inverness County, Nova Scotia.

Imports of barytes during the year totalled 2,954 tons at \$64,186 while the 1921 returns showed 1,439 tons at \$40,374. The importations of blanc fixé and satin white amounted to 2,549 tons worth \$88,541.

CHROMITE

The chromite industry continued quiescent throughout 1922. No mining operations were carried on by operators in Canada. Shipments amounted to 1,087 tons evaluated at \$19,566 were reported from the Black Lake district in the Eastern Townships of Quebec. This quantity consisted entirely of concentrates recovered from ore treated in former years and with the exception of a small quantity was all marketed in the United States.

The average price of chromite (50 per cent Cr_2O_3), in United States in the year under review was about \$22.50 a ton.

Imports into Canada in 1922 were as follows: Bichromate of soda, 720 tons at \$118,872; bichromate of potash, 48 tons at \$10,283; while exports of chrome concentrates amounted to 773 tons worth \$8,286.

COAL

OUTPUT.—The output of coal from Canadian mines during the twelve months of the calendar year 1922 was approximately 15,045,286 tons as compared with 15,057,493 tons in 1921; 16,946,764 tons in 1920. The great strike that tied up the United States coal mines for several months was reflected in Canada and resulted in a loss of 1,222,288 working days. Fifteen disputes between employees and employers occurred in the coal mining industry in Canada during the twelve months ending December, thirteen of which were in Alberta and southeastern British Columbia, and the other two in Nova Scotia. In all 25,251 men were affected, and of the time lost, 931,960 days were lost in the strike which began on April 1st, 260,034 days' time was lost in the short strikes originating in August, 19,036 shifts were lost in short strikes in December, and the rest of the time was lost in minor strikes during the year. Having in mind the fact that over one million working days' time was lost by the employees of the coal mining industry during the year, the output of fifteen million tons may be considered quite satisfactory. Alberta coal mine output amounted to 5,959,000 tons, a little more than half of which was lignite and nearly all the balance bituminous. The total value of Alberta's output was \$22,209,000; Nova Scotia contributed 5,558,000 tons valued at \$27,654,000 and occupied second place among the coal-producing provinces. British Columbia accounted for 2,927,000 tons with a value of \$14,740,000. Saskatchewan and New Brunswick followed with 302,000 tons valued at \$625,000 and 297,000 tons valued at \$1,252,000 respectively, while the Yukon Territory produced 500 tons valued at \$6,000.

Tables showing output, shipments and value of output for 1922 and 1921 have been prepared.

Output of Coal for Canada, by Kinds and Provinces, 1920, 1921 and 1922

Provinces	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
<i>Nova Scotia—</i>						
Bituminous.....	6,437,156	100	5,734,928	89	5,558,574	86
<i>New Brunswick—</i>						
Bituminous.....	171,610	100	187,192	109	297,452	173
<i>Saskatchewan—</i>						
Lignite.....	335,222	100	335,632	100	302,312	90
<i>Alberta—</i>						
Anthracite.....	127,513	100	96,964	76	40,417	31
Bituminous.....	3,419,147	100	2,867,833	84	2,817,985	82
Lignite.....	3,361,105	100	2,944,420	88	3,101,249	92
Total Alberta.....	6,907,765	100	5,909,217	86	5,959,651	86
<i>British Columbia—</i>						
Bituminous.....	3,095,011	100	2,890,291	93	2,926,832	94
<i>Yukon—</i>						
Bituminous.....			233		465	
<i>Total for Canada—</i>						
Anthracite.....	127,513	100	96,964	76	40,417	31
Bituminous.....	13,122,924	100	11,680,477	89	11,601,308	88
Lignite.....	3,696,327	100	3,280,052	89	3,403,561	92
Grand total.....	16,946,764	100	15,057,493	88	15,045,286	88

Total Output of Coal from Canadian Mines, by months, 1920, 1921 and 1922

Months	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
January.....	1,606,238	100	1,372,734	85	1,231,853	66
February.....	1,308,221	100	1,214,839	93	1,287,284	98
March.....	1,309,376	100	1,142,581	87	1,446,567	110
April.....	1,189,856	100	932,747	78	672,694	56
May.....	1,170,074	100	992,901	85	727,998	62
June.....	1,351,708	100	1,106,937	82	825,904	61
July.....	1,326,360	100	1,170,067	88	928,006	69
August.....	1,372,601	100	1,519,025	111	841,989	61
September.....	1,449,205	100	1,321,214	91	1,608,509	110
October.....	1,414,227	100	1,407,944	100	1,854,709	131
November.....	1,748,109	100	1,522,027	87	1,830,647	104
December.....	1,700,864	100	1,354,482	80	1,789,129	105
Total.....	16,946,839	100	15,057,493	89	15,045,286	88

Output, Shipments and Value of Coal by Provinces and Grades for the Year 1922

(Short tons)

Provinces	Output	Shipments	Total value of output	Average value per ton
			\$	\$
<i>Nova Scotia</i> —				
Bituminous.....	5,558,574	4,825,555	27,653,905	4.97
<i>New Brunswick</i> —				
Bituminous.....	297,452	287,208	1,251,975	4.20
<i>Saskatchewan</i> —				
Lignite.....	302,312	280,378	625,483	2.06
<i>Alberta</i> —				
Anthracite.....	40,417	6,499	137,821	3.41
Bituminous.....	2,817,985	2,700,690	11,793,267	4.18
Lignite.....	3,101,249	2,880,762	10,277,539	3.31
Total for Alberta.....	5,959,651	5,587,951	22,208,627	3.72
<i>British Columbia</i> —				
Bituminous.....	2,926,832	2,389,001	14,739,525	5.03
<i>Yukon</i> —				
Bituminous.....	465	460	6,510	14.00
Total for Canada.....	15,045,286	13,370,553	66,480,025	4.41

Output, Shipments and Value of Coal by Provinces and Grades for the Year 1921

(Short tons)

Provinces	Output	Shipments	Total value of output	Average value per ton
			\$	\$
<i>Nova Scotia</i> —				
Bituminous.....	5,734,928	5,006,015	27,782,050	4.84
<i>New Brunswick</i> —				
Bituminous.....	187,192	181,001	920,666	4.91
<i>Saskatchewan</i> —				
Lignite.....	335,632	309,919	823,180	2.45
<i>Alberta</i> —				
Anthracite.....	96,064	19,833	330,699	3.41
Bituminous.....	2,867,833	2,712,671	14,466,482	5.04
Lignite.....	2,944,420	2,673,604	12,449,333	3.22
Total for Alberta.....	5,909,217	5,406,109	27,246,514	4.61
<i>British Columbia</i> —				
Bituminous.....	2,890,291	2,286,226	15,676,774	5.42
<i>Yukon</i> —				
Bituminous.....	233	217	2,472	10.60
Total for Canada.....	15,057,493	13,189,487	72,451,656	4.81

INTERPROVINCIAL SHIPMENTS OF CANADIAN COAL.—Four million tons of Canadian coal moved in interprovincial trade during the year and of this amount about 2,302,000 tons was bituminous coal, the balance being mostly lignite. Shipments of Nova Scotia coal to other Canadian provinces, principally New Brunswick, Prince Edward Island and Quebec, amounted to almost 1,893,000 tons. The province of Quebec received about 1,434,000 tons of Canadian coal during the year, an increase of nearly 532,000 tons above the receipts of Canadian coal in the preceding year and fully five times as much as reached this province in 1920.

The restoration of the St. Lawrence trade to the normal pre-war figure of 2,000,000 tons per season was therefore almost overtaken during the twelve months just closed. Shipments of Canadian coal into the province of New Brunswick totalled 440,000 tons, while the shipments from that province to other points in Canada amounted to 73,000 tons. Only about 19,000 tons of Canadian coal was shipped into Central Ontario during the year. Manitoba and the section of Ontario lying west of Fort William and Port Arthur received approximately 715,000 tons. Saskatchewan's receipts of Canadian coal were about 1,240,000 tons, while the shipments from that province for domestic trade were slightly under 120,000 tons. Alberta coal to the extent of 1,885,000 tons found its way to other Canadian provinces and 96,000 tons of British Columbia coal was also shipped for consumption in other parts of Canada.

Two tables showing total shipments of all Canadian coal by destinations for 1922, 1921 are shown below.

Shipments of Coal from Canadian Mines by Destinations, 1922

(Short tons)

Destination	Nova Scotia (B)	New Brunswick (B)	Saskatchewan (L)	Alberta (A.B.L.)	British Columbia and Yukon (B)	Total
Coal supplied for bunkers...	371,225				317,148	688,373
Coal supplied to railroads...	652,603	31,219	8,056	2,167,154	112,024	2,971,056
Nova Scotia by sea and land including sales at Collieries.....	1,234,645	69				1,234,714
New Brunswick.....	440,086	153,528				593,614
Newfoundland.....	216,835					216,835
Prince Edward Island.....	71,807					71,807
Quebec.....	1,380,030	54,345				1,434,375
Ontario.....	1,061	18,370	108	25,530		45,119
West Indies.....						
United States.....	448,477	29,677	289	110,209	853,464	1,442,116
Europe.....	386					386
Other countries.....	8,230			65,599	1,198	75,027
Lost at sea.....	170					170
Manitoba.....			117,378	513,618	58,715	689,711
Saskatchewan.....			152,200	1,213,755	26,950	1,392,905
Alberta.....			588	1,359,852	10,646	1,371,086
British Columbia.....			1,759	132,184	1,008,856	1,142,799
Yukon.....					460	460
Total.....	4,825,555	287,208	280,378	5,587,951	2,389,461	13,370,553

A. Anthracite.
B. Bituminous.
L. Lignite.

Shipments of Coal from Canadian Mines by Destinations, 1921

(Short tons)

Destination	Nova Scotia (B)	New Brunswick (B)	Saskatchewan (L)	Alberta (A.B.L.)	British Columbia and Yukon (B)	Total
Coal supplied for bunkers...	347,132				*	347,132
Coal supplied to railroads...	1,059,502	*	303	2,060,943	90,902	3,211,650
Nova Scotia by sea and land including land sales at Collieries.....	1,539,342	241				1,539,583
New Brunswick.....	499,637	157,782				657,419
Newfoundland.....	207,523					207,523
Prince Edward Island.....	72,084					72,084
Quebec.....	887,701	14,055				901,756
Ontario.....			374	11,530		11,904
West Indies.....	905					905
United States.....	6,217	8,923	354	146,200	916,930	1,078,624
Europe.....	372,066					372,066
Other countries.....	13,522			112,774	48,565	174,861
Lost at sea.....	384					384
Manitoba.....			153,383	496,609	26,204	676,196
Saskatchewan.....			153,308	1,114,045	23,047	1,290,400
Alberta.....				1,351,577	7,786	1,359,363
British Columbia.....			2,197	112,431	1,164,135	1,278,763
Yukon.....					8,874	8,874
Total.....	5,006,015	181,001	309,919	5,406,109	2,286,443	13,189,487

* Not separately shown. (A.) Anthracite. (B.) Bituminous. (L.) Lignite.

EXPORTS.—Exported Canadian coal amounted to 1,819,000 tons for the year, comprising about 1,000,000 tons from the western provinces and the balance from the maritime provinces. In spite of the strike the amount of Canadian coal exported during the twelve months ending December, 1922, was only about 168,000 tons less than in the preceding year. The exports during 1920 were 2,558,000 tons, and in 1919 amounted to about 2,000,000 tons.

Details of the exported Canadian coal are shown in the following tables:—

Exports of Canadian Coal by Provinces, 1920, 1921 and 1922

Provinces	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
Nova Scotia.....	1,245,673	100	727,951	58	641,304	51
New Brunswick.....	113,050	100	71,534	63	66,460	58
Prince Edward Island.....	2	100	2	100		
Quebec.....	1,372	100	85	6	55,275	4,028
Ontario.....			10		76	
Manitoba.....	721	100	1,690	234	2,082	288
Saskatchewan.....	3,132	100	2,633	84	5,040	160
Alberta.....	3,106	100	843	27	915	29
British Columbia and Yukon.....	1,191,167	100	1,182,528	99	1,047,430	87
Total.....	2,558,223	100	1,987,276	78	1,818,582	71

Total Exports of Canadian Coal, 1920, 1921 and 1922

Months	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
January.....	332,763	100	185,297	56	124,100	37
February.....	145,004	100	86,503	60	116,450	80
March.....	252,189	100	177,209	70	174,236	69
April.....	118,592	100	79,014	67	46,188	38
May.....	195,494	100	131,650	67	54,046	27
June.....	234,915	100	209,331	89	90,406	38
July.....	129,801	100	289,199	223	242,607	186
August.....	422,021	100	225,301	53	235,765	55
September.....	198,651	100	149,845	75	209,190	105
October.....	201,655	100	179,157	89	190,395	94
November.....	172,169	100	134,864	78	168,957	98
December.....	154,969	100	139,906	90	166,242	107
Total.....	2,558,223	100	1,987,276	78	1,818,582	71

IMPORTS.—For the first time in many years quantities of coal were imported from Great Britain and in all about 817,000 tons was received, 639,000 tons of which was bituminous and 178,000 tons was entered as anthracite. The receipts at customs ports in Quebec of this coal from Great Britain amounted to 762,000 tons during the year while New Brunswick received 39,000 tons and the balance was almost equally divided between Ontario and Nova Scotia. Imports of coal from the United States amounted in all to 13,438,000 tons, comprising 10,924,000 tons of bituminous coal and 2,514,000 tons of anthracite coal. As compared with the records for the preceding year the imports of bituminous coal were 2,600,000 tons lower, and the imports of anthracite were 2,053,000 tons less. Comparison with 1920 figures would indicate an even greater shortage, as the imports of United States bituminous coal in that year were close to 16,000,000 tons and the anthracite imports came very near 5,000,000 tons.

A table showing imports of anthracite and bituminous coal from Great Britain for the six months ending December 31, 1922, has been prepared. A second table shows the imports of anthracite and bituminous coal from United States for 1920, 1921, 1922. Two tables giving total coal imported for the above-mentioned periods by provinces and by months are also shown.

Imports of Coal into Canada from Great Britain, July 1 to Dec. 31, 1922

Months	Anthracite	Bituminous	Total
	Short Tons	Short Tons	Short Tons
July.....	3,898	7,093	10,991
August.....	3,808	27,743	31,551
September.....	9,506	123,407	132,913
October.....	86,682	106,808	193,490
November.....	30,112	222,503	252,615
December.....	44,476	151,289	195,765
Total.....	178,482	638,843	817,325

Imports into Canada of Anthracite and Bituminous Coal from the United States, 1920, 1921 and 1922

	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
<i>Anthracite—</i>						
January.....	359,427	100	328,853	91	245,000	68
February.....	294,903	100	307,671	104	245,826	83
March.....	440,222	100	384,373	87	388,995	88
April.....	263,077	100	274,502	104	149,922	56
May.....	338,321	100	458,841	136	58,754	17
June.....	472,157	100	506,592	107	54,414	11
July.....	561,981	100	488,904	87	28,440	5
August.....	596,555	100	419,805	70	24,960	4
September.....	371,626	100	351,500	95	32,420	8
October.....	419,224	100	323,861	77	328,596	78
November.....	419,266	100	336,863	80	520,267	124
December.....	376,205	100	385,605	102	436,655	116
Total Anthracite.....	4,912,964	100	4,567,370	93	2,514,249	51
<i>Bituminous—</i>						
January.....	529,782	100	1,369,688	259	590,177	111
February.....	570,266	100	887,605	156	774,316	135
March.....	992,593	100	818,258	82	1,226,174	123
April.....	711,221	100	578,856	81	530,496	74
May.....	695,040	100	980,456	141	382,988	55
June.....	1,101,700	100	1,423,551	129	466,974	42
July.....	1,722,467	100	1,416,790	82	407,406	23
August.....	2,033,101	100	1,531,028	75	335,935	16
September.....	1,787,455	100	1,199,688	67	714,964	39
October.....	1,968,347	100	1,183,876	60	1,814,688	92
November.....	2,048,356	100	1,174,071	57	2,005,260	97
December.....	1,742,304	100	972,383	56	1,674,667	96
Total Bituminous.....	15,902,632	100	13,536,250	85	10,924,045	68

Imports of Coal from United States into Canada for 1920, 1921 and from United States and Great Britain for 1922, by Kinds and Provinces

	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
<i>NOVA SCOTIA—</i>						
Anthracite.....	45,334	100	62,245	137	27,064	59
Bituminous.....	3,044	100	1,875	62	9,500	312
Total.....	48,378	100	64,120	133	36,564	75
<i>NEW BRUNSWICK—</i>						
Anthracite.....	57,859	100	82,509	143	59,672	103
Bituminous.....	936	100	41,950	4,482	80,353	8,584
Total.....	58,795	100	124,459	212	140,025	238
<i>PRINCE EDWARD ISLAND—</i>						
Anthracite.....	5,544	100	6,643	120	4,589	82
Bituminous.....	513	100	238	46	1,355	264
Total.....	6,057	100	6,881	114	5,944	98
<i>QUEBEC—</i>						
Anthracite.....	1,544,456	100	1,311,712	85	941,964	60
Bituminous.....	3,503,410	100	2,684,566	77	1,926,185	54
Total.....	5,047,866	100	3,996,278	79	2,868,149	56

Imports of Coal from United States into Canada, &c.—*Con.*

Months	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
CENTRAL ONTARIO—						
Anthracite.....	2,945,782	100	2,809,327	95	* 1,586,936	53
Bituminous.....	10,373,324	100	8,733,828	84	* 7,492,253	72
Total.....	13,319,106	100	11,543,155	87	* 9,079,189	68
HEAD OF LAKES—						
Anthracite.....	295,682	100	260,890	88	* 57,525	19
Bituminous.....	1,963,579	100	1,975,918	101	* 1,962,269	99
Total.....	2,259,261	100	2,236,808	99	* 2,019,794	89
TOTAL ONTARIO—						
Anthracite.....	3,241,464	100	3,070,217	94	* 1,644,461	50
Bituminous.....	12,336,903	100	10,709,746	86	* 9,454,522	76
Total.....	15,578,367	100	13,779,963	88	*11,098,983	71
MANITOBA—						
Anthracite.....	17,509	100	33,473	191	14,715	84
Bituminous.....	43,547	100	76,833	176	74,848	171
Total.....	61,056	100	110,306	181	89,563	146
MANITOBA AND HEAD OF LAKES—						
Anthracite.....	313,191	100	294,363	94	* 72,240	23
Bituminous.....	2,007,126	100	2,052,751	102	* 2,037,117	101
Total.....	2,320,317	100	2,347,114	101	* 2,109,357	90
SASKATCHEWAN—						
Anthracite.....	206	100	254	123	231	112
Bituminous.....	535	100	2,127	398	1,484	277
Total.....	741	100	2,381	312	1,715	231
ALBERTA—						
Anthracite.....	517	100	66	13	.....	.....
Bituminous.....	607	100	1,829	301	1,147	188
Total.....	1,124	100	1,895	169	1,147	102
BRITISH COLUMBIA AND YUKON—						
Anthracite.....	75	100	251	335	35	46
Bituminous.....	13,137	100	17,086	130	13,494	102
Total.....	13,212	100	17,337	131	13,529	102
CANADA—						
Anthracite.....	4,912,964	100	4,567,370	93	(a) 2,692,731	54
Bituminous.....	15,902,632	100	13,536,250	85	(b) 11,562,888	72
Grand total.....	20,815,596	100	18,103,620	87	(c) 14,255,619	68

(a) Includes 178,482 tons imported from Great Britain.

(b) Includes 638,843 tons " " "

(c) Includes 817,325 tons " " "

* Includes coal " " "

**Total Imports of Coal into Canada from the United States for 1920-1921
and from United States and Great Britain for 1922**

Months	1920		1921		1922	
	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
January.....	889,209	100	1,698,541	191	835,177	93
February.....	865,169	100	1,195,276	138	1,020,142	117
March.....	1,432,815	100	1,202,631	84	1,615,169	112
April.....	974,298	100	853,358	88	680,418	69
May.....	1,033,361	100	1,439,297	139	441,742	42
June.....	1,573,857	100	1,930,143	123	521,388	33
July.....	2,284,448	100	1,905,694	83	* 446,837	19
August.....	2,629,656	100	1,950,833	74	* 392,446	14
September.....	2,159,081	100	1,551,188	72	* 880,297	40
October.....	2,387,571	100	1,507,737	63	* 2,336,774	97
November.....	2,467,622	100	1,510,934	61	* 2,778,142	112
December.....	2,118,509	100	1,357,988	65	* 2,307,087	108
Total.....	20,815,596	100	18,103,620	87	*14,255,619	68

*Includes coal imported from Great Britain.

COAL MADE AVAILABLE FOR CONSUMPTION IN CANADA.—For the whole of Canada the apparent consumption, or more properly, the coal made available for consumption in 1922 amounted to 27,482,000 tons and included 21,346,000 tons of bituminous coal; 3,403,000 tons of lignite; and 2,733,000 tons of anthracite coal. The principal coal-consuming province was Central Ontario in which 9,098,000 tons was made available, including 1,586,000 tons of anthracite coal. In 1921, the same area was supplied with 11,543,000 tons, and in 1920 with 13,331,000 tons. For Quebec 4,247,000 tons of coal was made available in 1922 as compared with 4,898,000 tons in 1921 and 5,327,000 tons in 1920.

The data in the following table show the coal made available for consumption in Canada, by months, during the past three years.

**Coal Made Available for Consumption in Canada, by Months,
1920, 1921 and 1922**

Months	1920		1921		1922	
	Short tons	Index No.	Short tons	Index No.	Short tons	Index No.
January.....	2,162,684	100	2,885,978	133	1,942,932	89
February.....	2,028,386	100	2,323,612	114	2,190,976	108
March.....	2,430,002	100	2,168,003	87	2,887,500	115
April.....	2,045,562	100	1,707,091	83	1,306,924	63
May.....	2,007,941	100	2,300,548	114	1,115,694	55
June.....	2,690,650	100	2,827,744	105	1,256,886	46
July.....	3,481,007	100	2,786,562	80	1,132,236	32
August.....	3,580,236	100	3,244,557	91	998,070	27
September.....	3,403,635	100	2,722,557	80	2,279,616	66
October.....	3,600,143	100	2,736,524	76	4,001,088	111
November.....	4,043,562	100	2,898,097	72	4,439,827	109
December.....	3,604,404	100	2,572,564	70	3,929,974	107
Total.....	35,204,212	100	31,173,837	89	27,482,323	78

The import and export items were compiled from data supplied by the Department of Customs, and in the case of imports, the figures given show the total quantity of coal imported from the United States* during the three years. Distinction must be made between this record and the figures given in the table of imports "entered for consumption." The tonnages "entered for consumption" represent only coal actually cleared from Customs for consumption in Canada. It often happens that large quantities of bituminous coal are brought into Canada but are not cleared from Customs until required for use, owing to the fact that there is a duty of 53 cents a ton on all bituminous coal, round and run-of-mine, imported. The export figures show the quantities cleared through Custom ports during the year. Coal mined in one province is sometimes shown as exported from another province, a notable instance being that the bulk of coal exported from the province of Alberta is shipped through the Customs ports of Fernie and Cranbrook, in British Columbia, while some Nova Scotia coal is exported through the port of St. John, New Brunswick.

From the data available it appears that in 1920 Canada produced 16.9 million tons, exported 2.5 million tons, imported 20.8 million tons, and thus apparently consumed 35.2 million tons. In 1921 when the output was 15 million tons, the quantity exported amounted to 1.9 million tons, imports 18.1 million tons, and the apparent consumption was 31.2 million tons. The decline in the consumption of coal in 1921 was in conformity with the prevalent depression in the industrial world. For 1922 the output was 15.0 million tons, the exports 1.8 million tons, the imports 13.4 million tons from the United States and 0.8 million tons from Great Britain, so that the apparent consumption was 27.4 million tons. The decrease in every item was due to the strikes prevailing during the year, although the apparent consumption of 27.4 million tons was also partly due to depressed industrial conditions. The output towards the close of the year was decidedly improved.

FELDSPAR

An increasing demand for Canadian feldspar was reflected in the greater activities of all operating companies. In the province of Quebec, the deposits in Derry township were active throughout the year. This spar is very pure with only a small percentage of quartz. Development work was carried on, by the St. Lawrence Feldspar Company on their large deposit at Quetachu Bay, Saguenay County, Quebec. This property, it is expected, will be ready to ship feldspar during 1923. Ontario deposits in the townships of Bathurst, Monteaigle and Loughborough were operated in 1922.

The total shipments of feldspar reported for the year under review were 27,878 tons, consisting of 15,895 tons from Ontario and 11,983 tons from Quebec. The average value per ton received by operators was: crude, \$8; ground, \$16.50; and dental spar, \$22. In addition to the sales of the crude and ground grades a quantity of crushed spar and dust was sold for use as stucco dash in the building industry. A shipment of dental spar was also made during this period.

The grinding plants at Kingston and Toronto, in Ontario, owned by the Frontenac Floor and Wall Tile Company and the Feldspar Milling Company, respectively, were operated during the year.

* 1922 "Coal available for Consumption" includes 817,000 tons imported from Great Britain.

Production, Imports and Exports of Feldspar, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
Production.....	29,868	230,754	27,878	227,625
Imports.....	1,050	25,120	1,454	31,408
Exports.....	27,293	169,864	24,995	170,954

FLUORSPAR

The production of fluorspar in Canada in 1922 was somewhat less than that recorded for 1921. Shipments for the year amounted to 4,503 tons, consisting of 284 tons crude at \$13.75 per ton and 4,219 tons of concentrates at \$23.29 a ton.

The principal producer during the year was the Rock Candy mine at Archibald, near Grand Forks, B.C. A total of 7,094 tons of fluorite ore was raised at this mine and 6,313 tons was milled in the decrepitation plant located on the same property. Rejects amounting to 2,186 tons, were re-treated by flotation at the Trail plant during the year. From these two processes 4,219 tons of concentrates were produced.

In Ontario, 198 tons of fluorite ore was mined during the year. Shipments of crude fluorspar totalling 284 tons were reported by four operators in the Madoc district.

A part of the fluorspar produced in Canada was used in this country and the remainder was shipped to steel plants in the United States. The continued depression in the steel industry was again reflected in the production of fluorspar. A revival in the steel industry would probably be closely followed by an increased fluorspar production.

Production, Imports and Exports of Fluorspar, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
<i>Production</i> —				
Ontario.....	116	1,744	284	3,905
British Columbia.....	5,403	134,523	4,219	98,233
Total.....	5,539	136,267	4,503	102,138
<i>Imports</i> —Hydro-fluo-silicic acid.....	1-05	212	0-06	15
Fluorspar.....	3,867	43,752	4,980	73,343
<i>Exports</i>	4,625	51,470	2,944	32,914

GRAPHITE

Shipments of graphite during 1921 amounted to 650 tons, consisting of 95 tons, flake at \$170.21 per ton, and 555 tons, dusts at \$35.05 a ton.

The Black Donald Graphite Company, Limited, and the Quebec Graphite Company were the only firms that reported shipments. While no mining operations were carried on by the former firm, its mill at Whitefish Lake was operated intermittently during the year and treated approximately 1,700 tons of graphite. The latter company made some shipments from stock.

The plant of the Standard Graphite Company, Limited, at Guenette, Quebec, was completed during the year and some 100 tons of ore were milled, mainly for testing purposes.

The latest United States tariff legislation, which was passed in 1922, levied the following duties on importations of crude or refined graphite, amorphous, 20 per cent ad valorem; chrystalline lump, chip or dust, 20 per cent ad valorem; chrystalline flake, 1½ cents per pound.

Production, Imports and Exports of Graphite, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
<i>Production—</i>				
Flake.....	149	29,187	95	16,170
Dusts.....	188	36,675	555	19,454
Total.....	337	65,862	650	35,624
<i>Imports—</i>				
Crucibles, plumbago.....		23,786		39,061
Plumbago not ground or otherwise manufactured.....		4,141		1,007
Plumbago ground and manufactures of, n.o.p.....		47,463		47,095
<i>Exports—</i>				
Graphite or plumbago, crude or refined.....	12,279	40,809	452	16,619

GYPSUM

Shipments of all grades of gypsum in Canada during 1922 amounted to 441,159 tons valued at \$2,043,145 or an increase of 54,609 tons and \$257,607 over the 1921 production. This year's sales as reported surpassed the record production of 1920.

The total output of gypsum rock was 492,164 tons of which quantity 140,078 tons or 28 per cent was calcined. The quantity quarried, by provinces was: Nova Scotia, 235,870 tons; New Brunswick, 92,118 tons; Ontario, 106,829 tons; Manitoba 39,147 tons; and British Columbia 200 tons. The average price per ton received by operators throughout Canada was, by grades; lump \$1.80; crushed, \$2.65; fine ground, \$6.17 and calcined, \$10.62. The quotations during the previous year were as follows: lump, \$1.78; crushed, \$2.56; fine ground, \$3.42 and calcined, \$10.61.

Production of Gypsum in Canada, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
Lump or Mine Run.....	195,456	347,180	232,821	419,336
Crushed.....	66,893	171,567	58,181	154,197
Fine ground.....	7,020	24,029	5,769	35,575
Calcined gypsum sold.....	46,088	493,874	25,447	311,499
Calcined gypsum used in the manufacture of gypsum products, such as wall plaster, alabastine, etc..... (Weight and value of gypsum content only)	71,093	748,888	109,001	1,115,120
Total sold or used.....	386,550	1,785,538	441,159	2,043,145

Imports into Canada and Exports of Gypsum, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
<i>Imports—</i>		\$		\$
Gypsum, crude (sulphate of lime).....	2,952	31,303	2,872	21,040
Plaster of Paris or gypsum ground not calcined...	41	2,427	148	5,592
Plaster of Paris, calcined and prepared wall plaster	2,635	42,325	3,657	49,015
Total.....	5,628	76,055	6,677	75,647
<i>Exports—</i>				
Gypsum or plaster, crude.....	230,011	417,502	325,354	505,404
Plaster of Paris ground, and prepared wall plaster	4,509	80,239	3,186	59,534
Total.....	234,520	497,741	328,540	564,938

IRON OXIDES

The province of Quebec continued to be the only producer of iron oxides in Canada. The total quantity mined during the year was 18,904 tons. Shipments were as follows: crude 4,930 tons, at \$16,407 and calcined 2,270 tons, at \$79,450 or a total of 7,200 tons valued at \$95,857. The crude oxide was quoted at \$13.31 per ton while the calcined product sold for \$35 a ton.

Imports of ochres, ochrey earths, siennas and umbers, amounted to 1,766 tons at \$73,115. Exports of mineral pigments, iron oxides, ochres, etc., totalled 1,259 tons with a value of \$60,104.

MAGNESITE

The production of calcined and clinkered magnesite in 1922 was 2,751 tons valued at \$74,223, a slight increase over the total for 1921, of 2,057 tons at \$66,296.

The total Canadian mine output amounting to 8,707 tons came from the deposits in Argenteuil county, Quebec. Of this quantity some 6,896 tons were milled.

The average value obtained per ton in the year under review was, by grades, crude \$9; calcined \$23; and clinkered \$29. The prices prevailing during the previous year were, crude \$8.98; calcined \$25.15; and clinkered \$35.75.

In United States imported dead-burned magnesite, on the Atlantic seaboard, sold for \$22 per ton in August. In December the price rose to \$43.50 a ton at Baltimore.

Production, Imports and Exports of Magnesite, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
<i>Production—</i>				
Crude	1,673	15,024	60	540
Calcined	684	17,200	928	21,359
Clinkered	1,373	49,096	1,823	52,864
Total	3,730	81,320	2,811	74,763
<i>Imports—</i>				
Magnesia	220	87,530	207	34,460
Magnesite	185	8,000	79	2,198
Magnesite firebrick		61,728		56,561
<i>Exports—</i>				
Magnesite, crude		5	800	1,800
Magnesite, calcined	1,402	63,603	940	21,317

MAGNESIUM SULPHATE

The magnesium sulphate deposit near Ashcroft, British Columbia, owned by the Basque Chemical Company, was operated during 1922. The total production reported, amounted to 1,400 tons at a value of \$34,900. The product sold to the tanning industry was quoted at \$13 per ton, while the C.P. product brought \$37.50 a ton. In addition to some sales of this commodity to local dealers, shipments were made to United States and as far east in Canada as Ontario and Quebec.

Imports into Canada of magnesium sulphate or epsom salts during the calendar year totalled 1,398 tons evaluated at \$44,499, while exports were recorded at 142 tons worth \$4,838.

MANGANESE

Although no mining operations were carried on in this industry in Canada during 1922, a shipment of 73 tons valued at \$2,044 was made from the deposits at New Ross, Lunenburg county, Nova Scotia. In 1921 shipments totalled only 68 tons but brought a considerably higher value, \$3,400, or \$50 per ton.

No shipments were reported from the Hill 60 group of claims near Cowichan Lake, Vancouver Island.

Exports of manganese ore in 1922 were 191 tons at \$4,830 while those for the preceding year were 28 tons at \$2,240.

MICA

Conditions in the mica industry in Canada during 1922 showed a considerable improvement over those prevailing in the previous year. The Lièvre-Gatineau district in Quebec and the Frontenac county deposits in Ontario continued to supply nearly the entire Canadian production.

The quantity of mica mined during the year was 200 tons with an estimated value of \$48,000. Sales reported were 3,543 tons, valued at \$129,281, consisting of 1,830 tons at \$52,494 from Ontario, and 1,713 tons worth \$76,787 from Quebec.

Production of Mica in Canada, by Grades, 1921-1922

Grade	1921			1922		
	Pounds	Value f.o.b. shipping point	Price per pound	Pounds	Value f.o.b. shipping point	Price per pound
		\$	\$ cts.		\$	\$ cts.
Rough cobbed.....	323,010	31,920	0-10	186,470	22,005	0-12
Ground mica.....	20,000	15	0-08			
Thumb trimmed—						
1 x 1 inches.....	21,252	2,857	0-13	17,580	0,996	0-40
1 x 2 ".....	7,683	1,718	0-22			
1 x 3 ".....	8,064	2,438	0-30			
2 x 3 ".....	4,207	2,115	0-50			
2 x 4 ".....	4,891	4,544	0-92			
3 x 5 ".....	1,488	2,264	1-52			
4 x 6 ".....	655	1,240	1-89			
Splittings.....	20,350	15,365	0-76	111,408	56,042	0-51
Scrap.....	986,230	5,282	0-50	5,940,002	30,050	0-005
Pattern.....	277	305	1-10			
Total.....	1,404,107	70,063	0-05	7,086,600	129,281	0-18

Exports of Mica from Canada, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
Rough cobbed and thumb trimmed.....	12	12,942	74	45,151
Mica splittings.....	135	195,479	286	366,974
Mica, scrap and waste.....	967	12,061	3,473	41,949
Mica, plate and manufactures of (micanite).....		4,201		10,438
Total.....		224,683		464,512

NATRO-ALUNITE

The deposit of natro-alunite located at Kyuquot Sound on the West Coast of Vancouver Island, British Columbia, which was operated during 1921 was idle throughout 1922. Milling operations were carried on for twenty-six days in March, at the plant at Esquimalt, near Victoria, owned by the San Juan Mining and Manufacturing Company. The treatment of this ore consisted in crushing, grinding and washing. Shipments during the year amounted to 50 tons valued at \$2,500 as against 30 tons worth approximately \$1,500 in the previous twelve months.

NATURAL GAS

The production of natural gas in Canada in 1922 of 14,954,097 thousand cubic feet exceeded the previous year's output by approximately 876,496 thousand cubic feet. Ontario continued to be the principal producer, closely followed by the province of Alberta. The production of the latter province of 6,400,000 thousand cubic feet showed an increase of 1,454,116 thousand cubic feet over its total for 1921.

The average value per thousand cubic feet was as follows: Ontario, 48·7 cents; Alberta, 23·8 cents; New Brunswick, 20 cents. The average for the whole of Canada was 36·6 cents per thousand.

Production of Natural Gas in Canada, by Provinces, 1921-1922

Province	1921		1922	
	M cu. ft.	Value	M cu. ft.	Value
		\$		\$
New Brunswick	708,743	139,375	753,897	145,303
Ontario.....	8,422,774	3,080,130	7,800,000	3,798,600
Alberta.....	4,945,884	1,374,599	6,400,000	1,525,000
Manitoba.....	200	60	200	60
Total.....	14,077,601	4,594,164	14,954,097	5,468,963

PEAT

The Alfred bog, where experimental operations are being conducted jointly by the Ontario and Federal Governments, was active during the months of May, June, July and August. The production during that period amounted to 4,700 tons of which quantity, 3,000 tons, valued at \$14,500, were sold. During the previous year sales totalled 1,666 tons with a selling value of \$4 per ton.

PETROLEUM

The total production of petroleum in Canada during 1922, amounted to 178,567 barrels, valued at \$609,679 as against 187,541 barrels at \$641,533 in the preceding year.

The Ontario output of 164,731 barrels showed a decline of approximately 8,000 barrels as compared with the production for 1921. The average value per barrel (less bounty) during the first six months was \$2.88 while the average for the year was somewhat lower, namely \$2.67.

An advance of nearly 300 barrels was noted in the New Brunswick output, this year's total being 7,778 barrels at \$28,359 (less bounty). The average price for the year was \$3.65 per barrel, a decline of 24 cents from the average prevailing in 1921.

For comparative purposes, tables are given below showing production, imports and exports of petroleum during 1921 and 1922.

Crude Petroleum Production in Ontario* by Fields, 1921-1922

Field	Quantity in Barrels	Value Less Bounty	Bounty Paid	Total Value
		\$	\$	\$
<i>Year ending December 31, 1922—</i>				
Petrolia and Enniskillen.....	64,934 32/35	173,375	34,091	217,466
Oil Springs.....	43,213 19/35	115,380	22,687	138,067
Moore Township.....	7,274 20/35	19,424	3,819	23,243
Sarnia Township.....	3,223 26/35	8,607	1,692	10,299
Plympton Township.....	695	1,856	365	2,221
Bothwell.....	25,650 34/35	68,568	13,482	82,050
Tilbury East.....	126 32/35	338	67	405
West Dover.....	5,482 11/35	14,638	2,878	17,516
Raleigh Township.....	663 14/35	1,771	348	2,119
Dutton.....	356 27/35	1,033	203	1,236
Onondaga.....	489 15/35	1,307	257	1,564
Moza Township.....	11,959 14/35	31,932	6,279	38,211
Thamesville.....	383 19/35	1,024	202	1,226
Dawn Township.....	216 34/35	579	114	693
Total.....	164,731 17/35	439,832	86,484	526,316
<i>Year ending December 31, 1921—</i>				
Petrolia and Enniskillen.....	68,483 32/35	185,591 40	35,954.09	221,545.49
Oil Springs.....	40,966 22/35	111,019 57	21,507.31	132,526.88
Moore Township.....	7,536 4/35	20,422 86	3,956.47	24,379.33
Sarnia Township.....	4,068 20/35	11,025 82	2,135.96	13,161.78
Plympton Township.....	480 21/35	1,302 43	252.50	1,554.73
Bothwell.....	26,877 1/35	72,836.75	14,110.46	86,947.21
Tilbury East.....	1,002 20/35	2,716 96	520.35	3,233.31
West Dover.....	7,473 10/35	20,252.62	3,923.46	24,176.08
Raleigh Township.....	3,320 13/35	8,998.21	1,743.20	10,741.41
Dutton.....				
Onondaga.....	566 6/35	1,534.32	297.24	1,831.56
Moza Township.....	10,764 3/35	29,170.69	5,651.16	34,821.85
Thamesville.....	1,319 20/35	3,576.03	692.78	4,268.81
Total.....	172,858 32/35	468,447 66	90,750.78	559,198.44

*Supplied by the Supervisor of Crude Petroleum Bounties, Petrolia, Ont.

Production of Crude Petroleum in Canada, by Provinces, 1921-1922

Province	1921		1922	
	Barrels	Value	Barrels	Value
		\$		\$
New Brunswick.....	7,479	33,022	7,778	32,732
Ontario.....	172,859	559,198	164,731	526,316
Alberta.....	7,203	49,313	6,058	50,631
Total for Canada.....	187,541	641,533	178,567	609,679

Imports into Canada and Exports of Petroleum and its Products, 1921-1922

	1921		1922		
	Quantity	Value	Quantity	Value	
		\$		\$	
<i>Imports—</i>					
Crude petroleum in its natural state, .7900 specific gravity or heavier at 60 degrees temperature, when imported by oil refiners to be refined in their own factories.....	Gals.	355,300,352	20,010,091	419,559,952	21,602,247
Crude petroleum, gas oils other than naphtha, benzene and gasoline lighter than .8235 but not less than .775 specific gravity at 60 degrees.....	"	222,241	18,737	913,415	76,900
Petroleum (not including crude petroleum imported to be refined, or illuminating or lubricating oils) .8235 specific gravity or heavier at 60 degrees temperature.....	"	61,176,430	3,796,977	71,891,597	3,014,390
Petroleum, imported by miners or mining companies or concerns, for use in the concentration of ores of metals in their own concentrating establishments.....	"	18,022	3,579	17,672	4,075
KEROSENE AND ILLUMINATING OILS					
Coal oil and kerosene, distilled, purified or refined.....	"	10,544,281	790,468	3,673,234	314,514
Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale or lignite, costing more than 30 cents per gallon	"	120,416	62,323	99,497	50,045
LUBRICATING OILS					
Lubricating oils, composed wholly or in part of petroleum, and costing less than 20 cents per gallon.....	"	2,032,361	374,596	3,898,930	720,223
Lubricating oils, n.o.p.....	"	3,008,095	1,559,965	3,211,124	1,412,473
OTHER OILS					
Gasoline under .725 specific gravity at 60 degrees temperature.....	"	21,101,146	4,665,200	24,743,275	5,411,972
Gasoline .725 specific gravity but not heavier than .750 specific gravity at 60 degrees temperature (a).....	"			13,466,760	2,579,643
Gasoline, n.o.p.....	"	19,163,561	2,946,258	3,902,204	769,309
All other oils, n.o.p.....	"	57,667	39,040	144,927	60,469
OTHER PRODUCTS OF PETROLEUM					
Grease, axle.....	Lb.	3,289,526	296,971	2,851,550	177,575
Paraffine wax.....	"	1,362,188	72,661	870,564	51,032
Paraffine wax candles.....	"	201,906	45,729	199,762	39,299
Vaseline and all similar preparations of petroleum for toilet, medicinal or other purposes.....			219,886		242,743
Petroleum, products of, n.o.p.....	Gals.	13,113,087	1,990,496	1,330,170	289,815
Total Petroleum and its Products.....			36,892,977		36,816,724
<i>Exports—</i>					
Oil, coal and kerosene, crude.....	Gals.	5,384,751	375,820	7,036,627	288,828
Oil, coal and kerosene, refined.....	"	1,466,422	209,282	1,471,947	136,834
Oil, gasoline and naphtha.....	"	762,080	212,638	1,976,244	510,037
Oil, mineral, n.o.p.....	"	105,499	31,279	1,155,865	206,709
Wax, mineral.....	Cwt.	821	7,552	15,615	45,526
Total Petroleum and its Products.....			836,571		1,187,934

(a) From May 24, 1922.

PHOSPHATE

While no phosphate rock was mined during 1922, shipments amounting to approximately 90 tons valued at \$1,060 were made from stock on hand. Of this quantity 60 tons was purchased for consumption in Canada and the balance was sold for shipment to United States. The price quoted by United States buyers for the crude rock was \$20 per ton as compared with the prevailing price of \$15 in 1921.

Imports recorded for the year amounted to 11,515 tons at \$56,353 as against 13,711 tons worth \$86,531 in 1921.

PYRITES

The total mine output of pyritic ore (iron and copper) during 1922, was 19,048 tons. Sales for the same period amounted to 19,324 tons valued at approximately \$4.16 per ton. The average value per ton received by Ontario operators was \$3.54; while the British Columbia producers sold their product at \$5 a ton.

No copper-pyritic ore was shipped by the Weedon mines in Quebec in 1922. The Caldwell mine and the Sulphide mine, owned respectively, by the Grasselli Chemical Company, Limited, and the Nichols Chemical Company, Limited, were the Ontario shippers. In British Columbia, the Hidden Creek mine at Anyox and the Sullivan mine at Kimberley were active during the year.

According to Customs records no exports of pyrites were made in 1921 or 1922.

Production, Imports and Exports of Pyrites, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
		\$		\$
<i>Production by Provinces—</i>				
Quebec.....	1,986	10,463		
Ontario.....	27,785	101,306	11,235	39,763
British Columbia.....	3,597	4,557	8,089	40,445
Total.....	33,368	116,326	19,324	80,208
<i>Imports—</i>				
Brimstone, or sulphur in roll or flour.....	78,762	1,272,619	123,158	1,700,604

QUARTZ

The total quarry output of quartz in 1922 was 129,657 tons, consisting of 96,271 tons from Ontario; 11,386 tons from Quebec and the balance 22,000 tons from British Columbia. Sales for the same period totalled 112,716 tons valued at \$213,913 or an average of \$1.90 per ton. The average selling price per ton in 1922 was, crushed \$5.05 and crude \$1.63 as against \$3.88 and \$2.78, respectively, in 1921.

The crushing plant of the Silico Limited at St. Canut in the province of Quebec, commenced operating at full capacity in June and continued throughout the remainder of the year to produce large quantities of silica sand. The Feldspar Milling Company, Limited at Toronto, Ontario started to grind silica during the year; this product is sold to feldspar users in Eastern Canada.

The Dill quartz quarry owned by the International Nickel Company remained inactive during the entire period. This company was a large producer in 1921.

Production and Imports of Quartz, 1921-1922

	1921		1922	
	Tons	Value \$	Tons	Value \$
<i>Production—</i>				
Quebec.....	5,994	29,824	10,821	52,374
Ontario.....	72,068	220,800	80,895	115,539
British Columbia.....	22,288	62,317	21,000	46,000
Total.....	100,350	312,947	112,716	213,913
<i>Imports—</i>				
Silex or crystallized quartz, ground or unground..	1,211	36,041	1,058	25,248
Flint.....	5,061	84,761	6,633	92,094

SALT

The output of salt from all sources in Canada during 1922 totalled 187,463 tons, of which quantity 177,193 tons were marketed. The selling value less the cost of packages amounted to \$1,646,666. By comparison, it will be noted that the 1922 records show an increase of approximately 12,535 tons or 7.6 per cent in quantity and a decrease of \$27,019 or 1.1 per cent in value over the reports for the corresponding period of 1921.

The sales of this commodity by Ontario producers amounted to \$1,592,000. The Nova Scotia shipments from the Malagash Mine were 4,763 tons of rock salt, averaging \$10.56 per ton and 290 tons of land salt at \$15 a ton.

Production of Salt in Canada, by Grades, 1921-1922

Grade	Quantity manu- factured	Quantity sold	Value of salt sold (not including packages)	Stocks on hand at end of year
	Tons	Tons	\$	Tons
1922				
Table and dairy.....	42,317	41,949	803,248	184
Common fine.....	46,641	38,383	405,328	5,963
Common coarse.....	31,304	30,038	272,143	2,816
Land salt.....	3,171	3,177	28,618	34
Other grades.....	7,636	7,252	77,563	547
Brine for chemical works..... (Salt equivalent sold or used)	56,394	56,394	59,766	.....
Value of packages.....			531,183	.....
Total.....	187,463	177,193	2,177,849	9,544
1921				
Table and dairy.....	40,992	40,961	755,721	31
Common fine.....	41,398	36,074	455,204	6,526
Common coarse.....	33,442	30,905	327,279	3,935
Land salt.....	3,246	3,197	39,071	119
Other grades.....	3,017	2,989	27,713	28
Brine for chemical works..... (Salt equivalent sold or used)	50,532	50,532	68,697	.....
Value of packages.....			661,631	.....
Total.....	172,627	164,658	2,335,316	10,639

Imports into Canada and Exports of Salt, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
<i>Imports—</i>		\$		\$
Salt for the use of the sea or gulf fisheries.....	50,515	274,763	82,185	355,890
Salt in bulk, n.o.p.....	45,677	294,543	61,913	321,380
Salt, n.o.p. in bags, barrels, etc.....	33,531	455,962	51,772	596,513
Total.....	129,723	1,025,268	195,870	1,273,783
<i>Exports.....</i>	348	7,584	740	10,053

SODIUM SULPHATE

According to reports at hand, sales of sodium sulphate during 1922 amounted to 564 tons with a total value of \$8,460, as against 1,624 tons at \$18,850 in the previous twelve months. These shipments were made from two natural deposits of sodium sulphate in Saskatchewan, one near Hardy, and the other at Maskakee Lake.

Imports of salt cake increased from 16,173 tons at \$381,513 in 1921, to 39,472 tons valued at \$830,515 in the year under review. This commodity is imported into Canada duty free.

TALC

The mining and milling of talc in Canada was carried on more extensively in 1922 than in the previous year. This industry showed signs of having recovered from the effects of the depression in 1921. The total quantity of ore mined during the year under review was 14,500 tons, of which quantity 10,363 tons were ground. The sales of the milled product amounted to 13,558 tons, as against 10,134 tons in 1921. The average selling price in 1922, by grades, was as follows: high-grade, \$22; medium, \$13; and low-grade, \$9. The prices were similar to the prevailing quotations during the previous year.

The exports of crude and refined talc were considerably higher than those of the preceding twelve months.

Production and Exports of Talc, 1921-1922

	1921		1922	
	Tons	Value	Tons	Value
<i>Production.....</i>	10,134	\$ 141,565	13,558	\$ 185,197
<i>Exports—</i>				
Talc, crude.....	36	234	5,054	3,698
Talc, refined.....	7,079	112,490	9,601	140,240

STRUCTURAL MATERIALS AND CLAY PRODUCTS

CLAY PRODUCTS

Clay products manufactured during 1922, of which a record is included in the total of the mineral production of Canada, comprised building brick of the several kinds, except sand-lime brick, drain tile made from clay, sewer pipe and similar products. The total value of these clay products sold during the year amounted to \$10,453,865, consisting of \$7,458,418 worth of brick, \$1,767,054 worth of sewer pipe, \$436,551 worth of drain tile, and \$791,842 for all other clay products included in the above category.

Ontario produced more than 50 per cent of the products listed above and Quebec was credited with about one-half as much. Every province in the Dominion was represented in this industry, the products of which are largely made in the districts in which they are used.

Kaolin and fire clay are also produced in Canada, the former by one firm in Quebec province and the latter in the provinces of Nova Scotia, Saskatchewan, Alberta and British Columbia. At the time of writing reports for kaolin were incomplete and the total production of fire clay for Canada was 9,832 tons valued at \$50,408.

In 1921 the value of the imports into Canada of clay and clay products amounted to \$7,249,597 and the exports were valued at \$245,835. In 1922 the value of the imports amounted to \$6,664,503, a decrease of \$585,094 or eight per cent, while the exports totalled \$311,048 showing an increase of \$65,213 or 27 per cent. Details of the imports and exports of these commodities during 1922 are shown below.

Imports into Canada and Exports of Clay and Clay Products, 1922

		Quantity	Value
			\$
<i>Imports—</i>			
Bath brick.....			1,043
Building brick.....	M	7,468	174,321
Building blocks.....			79,689
<i>Clays—</i>			
China.....	cwt.	257,953	173,988
Fire.....	cwt.	615,830	138,995
Pipe.....			2,864
Other clays.....			65,422
Drain tile, unglazed.....			692
Drain and sewer-pipe.....			61,397
Earthenware.....			3,931,943
Firebrick (a).....			611,564
Firebrick, n.o.p.....			361,338
Magnesite brick.....			56,561
Silica brick.....			131,517
Paving brick.....	M	1,766	45,686
Other clay manufactures.....			827,483
Total.....			6,664,503
<i>Exports—</i>			
Building brick.....	M	2,418	31,383
<i>Clay—</i>			
Unmanufactured.....	cwt.	2,589	1,777
Manufactures.....			104,933
Earthenware.....			172,955
Total.....			311,048

(a) Duty free, of a kind not made in Canada.

CEMENT

The sales of cement in Canada during 1922 increased by about one million barrels over the record for the previous year. The figures were, 6,943,968 barrels in 1922 as against 5,752,885 barrels in 1921. During the period under review no puzzolan cement was produced, while in 1921 the sales were some 4,761 barrels.

The principal producing provinces were Ontario and Quebec, the sales of cement from the former province being valued at approximately \$6,394,000 while the cement from mills in Quebec amounted to almost \$5,908,000. The cement manufactured in the province of Quebec amounted to 2,660,935 barrels, while Ontario produced 3,104,382 barrels.

Exports of cement in 1922 amounted to 1,487,981 cwt., equivalent to 425,137 barrels of 350 pounds each, valued at \$699,738 as against 848,208 cwt., the equivalent of 242,345 barrels valued at \$650,658 in 1921.

The imports of cement and manufactures of cement during the year amounted to \$96,310 as against \$82,615 in 1921.

CEMENT PRODUCTS

While cement products have not been included in the report of the mineral production of Canada, statistics relating to the manufacture of these products are of some interest to the cement producing industries, and a note has therefore been included. At the time of going to press returns were incomplete from the makers of cement bricks, blocks, tile, etc., but sufficient returns were in hand to indicate that the 1922 production would aggregate about one million and a half dollars in value, most of which was produced in Ontario, although a number of makers in Quebec and New Brunswick also reported quantities.

LIME

The production of lime during 1922 amounted to 6,919,247 bushels valued at \$2,663,943. In addition to this a total of 40,112 tons of hydrated lime valued at \$514,172 was also made during the period. The total value of the lime produced during the year was therefore \$3,178,115 as compared with a valuation of \$2,781,197 for 1921.

The average price obtained for the product remained in the neighbourhood of 38 cents per bushel as against 40 cents in 1921, although there was the customary variation in the prices obtained in the several provinces of the Dominion.

Over one million dollars' worth of lime was produced in Ontario during the year and nearly eight hundred thousand dollars' worth in Quebec. Ontario was the leader in the production of hydrated lime, more than 37,000 tons being produced in the twelve months. The production of quicklime in Ontario was a little more than three million and in the province of Quebec about two million bushels.

Both imports of lime into Canada and exports have increased during 1922; the figures are imports, \$27,942 in 1922 as against \$19,512 in 1921; exports, \$270,724 in 1922 as against \$247,112 in the previous year.

Summary statistics covering lime sold or used, by provinces, are given in the following table (data subject to revision).

Lime Sold or Used, 1922

Province	Quicklime		Hydrated Lime		Total Value
	Quantity	Value	Quantity	Value	
	Bushels	\$	Tons	\$	\$
Nova Scotia.....					
New Brunswick.....	374,989	179,610			179,610
Quebec.....	1,942,040	759,905	81	972	760,967
Ontario.....	3,611,022	1,265,775	37,094	482,543	1,748,318
Manitoba.....	413,283	136,375			136,375
Saskatchewan.....					
Alberta.....	144,197	67,868	28	336	68,204
British Columbia.....	433,716	254,320	2,909	30,321	284,641
Dominion Total.....	6,919,247	2,663,943	40,112	514,172	3,178,115

SAND-LIME BRICK

A record of the production of sand-lime brick has always been included in the reports of mineral production, but as a detailed record of this industry will appear in the general report of manufactured products, only a few notes are here included. The number of sand-lime bricks produced during 1922 was 56,909,766, the total selling value amounting to \$864,358. In 1921 the total number made was 43,457,036 and were valued at \$662,744. The increase in quantity was therefore in the neighbourhood of 13,000,000 bricks and in value amounted to approximately \$200,000.

About seven-eighths of the production of sand-lime brick was credited to Ontario, the value of the production in this province being \$723,325. At the time of going to press returns were incomplete and some of the data in the foregoing statement were estimated. No returns had been received from Manitoba or Saskatchewan at time of writing.

STONE

The production of stone for building, monumental and ornamental purposes, for paving, curbstones and flagstones and for the other purposes in which quarry stone is used amounted in 1922 to a total value of \$7,607,495 an increase of more than 19 per cent of the value of the output in the preceding year.

Ontario was the principal producing province, leading with a production value of \$4,710,056, Quebec came second with \$2,326,183 while British Columbia, New Brunswick, Nova Scotia and Alberta followed in the order named.

The kinds of stone quarried included granite (trap rock, syenite and other igneous rocks), limestone, sandstone, and marble. In this industry, as in the manufacture of lime, the increase in the construction industries accounted for the advance in the year's production.

The value of the stone quarried and sold or used is given in the following table which shows the value of the output by provinces for the past two years.

Value of Stone Sold or Used, 1921-1922

Province	1921	1922
	\$	\$
Nova Scotia	116,602	107,548
New Brunswick.....	97,290	119,463
Quebec.....	*1,684,966	2,326,183
Ontario.....	4,167,582	4,710,056
Manitoba.....	56,666	36,749
Saskatchewan.....		
Alberta.....	13,750	25,515
British Columbia.....	229,165	281,981
Dominion Total.....	6,366,021	7,607,495

* Includes \$22,325 worth of slate.

The value of the imports of stone for 1922 amounted to \$937,726, while in 1921 the total value was \$927,694. Exportations were valued at \$134,252 in 1922 as against \$57,924 in 1921. The imports showed an increase of \$10,032, or about one per cent, while the exports showed an increase of \$76,328 or 132 per cent.

Imports into Canada and Exports of Stone, by Kinds, 1922

	Tons	Value
		\$
<i>Imports—</i>		
Building stone.....		371,490
Granite.....		72,633
Marble.....		294,206
Refuse stone.....	328,679	199,397
Total.....		937,726
<i>Exports—</i>		
Crushed.....	126,063	80,544
Ornamental, rough.....	2,666	32,474
Building, rough.....	2,357	13,364
Dressed.....		7,870
Total.....		132,252

SAND AND GRAVEL

The value of the reported production of sand and gravel in 1922 was \$2,624,324. Reports of this commodity are necessarily incomplete, but returns to date would indicate a slight increase in the total value of the production over 1921, in which year the value amounted to \$2,537,249. More than 50 per cent of the quantity of sand and gravel sold or used was produced by railway companies, for their own use, mainly as ballast.

The quantity of sand and gravel imported into Canada during 1922 was 350,992 tons, valued at \$175,667, while the exports amounted to \$713,709 tons, valued at \$116,121.

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