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CANADA

DOMINION BUREAU OF STATISTICS

MINING, METALLURGICAL AND CHEMICAL BRANCH

Historical File Copy

ANNUAL REPORT

OF THE

# MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR

1921

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



OTTAWA
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#### LIST OF PUBLICATIONS

PREPARED IN THE

#### MINING, METALLURGICAL AND CHEMICAL BRANCH, DOMINION BUREAU OF STATISTICS

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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; the series when complete will cover every phase of mineral production in Canada.

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#### 2. Manufactures of Non-Ferrous Metals-

Aluminium Ware—Brass and Copper Products,—Lead, Tin and Zinc Products.—Manufacture of the Precious Metals—Electrical Apparatus and Supplies Miscellaneous Non-Ferrous Metal Goods.

#### 3. Manufactures of Non-Metallic Minerals-

Abrasive Products—Asbestos Products—Coke and Its Products—Gas, Illuminating and Fuel—Glass and Its Products—Graphite Products—Petroleum and Its Products—Stone and Concrete Products—Miscellaneous Non-Metallics Mineral Products.

#### 4. Chemicals and Allied Products-

Coal Tar and Its Products—Acids, Alkalies, Salts and Compressed Gases—Explosives, Ammunition, Fireworks and Matches—Fertilizers—Medicinal and Pharmaceutical Preparations—Paints, Pigments and Varnishes—Soaps, Washing Compounds and Toilet Preparations—Inks, Dyes and Colours—Wood Distillates and Extracts—Miscellaneous Chemical Industries.

#### Monthly:

1. Production of Iron and Steel in Canada.

In addition to the foregoing printed summary reports, a series of bulletins is being prepared, each number of which contains detailed statistics of a particular industry.

Copies of the available publications may be had upon request.

#### TABLE OF CONTENTS

	PAGE
List of Publications Inside front ed	over
Preface	5
Part One—Commodity Statistics	
Mineral Production of Canada	6
General Statistical Review	9
METALLICS-	
Alaminium	25
Antimony	26
Cobalt	28
Copper	32
Gold	38
Iron Ore	49
Pig-Iron	50
Steel	51
Lead.,	52
Mercury	58
Molybdenum	59
Nickel	61
Platinum and Palladium	66
Silver	69
Tin	76
Tungsten	77
Zine	77
Non-Metallics—	83
Abrasives	85
Actinolite	85
Arsenie	86
Asbestos	87
Barytes	88
Coal	88
Feldspar	94
	95
Fluorspar	95
Graphite	97
Iron Oxides	0.7
Magnesium Sulphate	
Manganese	99
Mica	
Mineral Water	
Natro-Alunite	400
Natural Gas	
Peat	
Petroleum,	
Phosphate	
Pyrites	
Quartz	108
53150—14	

Non-Metallics—Concluded.	PAGE
Salt	109
Sodium Carbonate	
Sodium Sulphate	
Tale	111
STRUCTURAL MATERIALS AND CLAY PRODUCTS-	
Cement	113
Clay and Clay Products	
Lime	
Sand and Gravel	118
Sand-Lime Brick	
Slate	
Stone	120
Part Two-General Statistics	
Co and Barian of the Minard Yndrotus	105
General Review of the Mineral Industry	125
METALLIC MINERAL INDUSTRIES—	
Alluvial Gold Mining	. 133
Auriferous Quartz Mining and Milling	135
Copper-Gold-Silver Mining	. 143
Nickel-Copper Mining.	
Silver-Cobalt Mining and Milling	
Silver-Lead-Zinc Mining and Milling	
Iron Ore Mining.	
Metallurgy of the Non-Ferrous Metals	170
Non-Metallic Mineral Industries-	
Asbestos Industry	
Coal Mining	
Feldspar Industry	
Gypsum Industry	
Mica Industry	
Natural Gas Industry	
Petroleum Industry	
, and the same of	
MISCELLANEOUS NON-METALLIC MINERAL INDUSTRIES (Fluorspar, Grindstones, Iro	
Oxides, Magnesite, Quartz, Talc, etc.)	. 212
STRUCTURAL MATERIALS AND CLAY PRODUCTS INDUSTRIES-	
Cement Industry	. 217
Clay Products Industry	
Lime Burning Industry	
Sand and Gravel Industry	
Stone Quarrying	. 231

#### PREFACE

The present Annual Report on the Mineral Production of Canada is designed to supplement the Preliminary Reports on this subject issued by the Dominion Bureau of Statistics as for the six months ending June 30, 1921, and for the twelve months ending December, and to present the final figures for the

whole of the calendar year.

Annual statistical reports on the mineral production of Canada have been published for many years, first by the Geological Survey and later by the Mines Branch of the Department of Mines. The present report is issued in continuance of this series, and every effort has been made to ensure complete continuity of the record. Some changes, however, in the format have been made, and certain new material has been introduced which it is believed will be found of value to the mineral industry.

The statistics relating to the different minerals and the general statistical tables have been prepared as formerly, although the plan of issuing two reports, one on mineral production generally, and one on the production of metals, has been discontinued; the sections on metals in this report have been

expanded so that the records are complete in one cover.

The general reviews of the principal mineral industries, (e.g., the coppergold industry, the silver-lead-zinc industry, the nickel-copper industry, etc., etc.) and the section on metallurgical works are included for the first time. In recent years the value of statistics of this character, covering capital, labour, equipment, etc., has become more generally recognized and the demand for such information has greatly increased. It is thought that in these new sections a contribution has been made to the literature of the mineral industry which will prove distinctly valuable, as it will definitely illustrate the place which mining holds in the scheme of Canadian productive enterprise.

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. It may be added that the co-ordination of the general work on mining statistics between the Provincial Departments and the Bureau has made progress during the year. It has been found possible to arrange for the co-operative collection of monthly statistics of coal production with all the provinces in which such records are obtained, namely, Nova Scotia, New Brunswick, Saskatchewan, and Alberta. In the field of general mining statistics, conferences with the Ontario Department of Mines have resulted in a plan whereby the final data for the year 1921 were collected on joint forms, thus preventing overlapping and duplication of work. The data collected by the Bureau on mining statistics are made available to the Dominion Department of Mines.

The thanks of the Bureau are also tendered to the mine and smelter operators, for assistance given and information made available. The railway and other transportation companies, as well as smelter operators outside of Canada. have also furnished data the receipt of which is gratefully acknowledged.

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. November 30, 1922.

Table 1 Mineral Production of Canada, 1920 and 1921\*

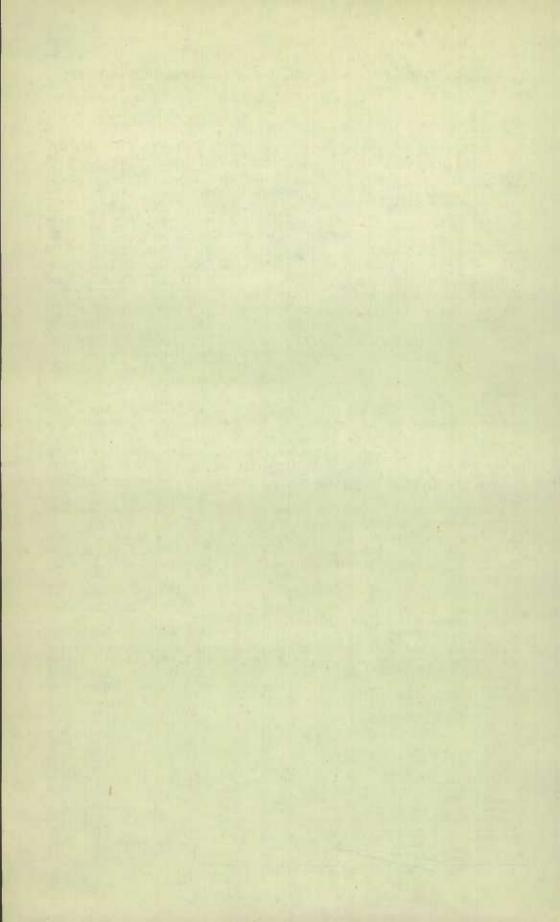
Martified   Cobalt, metallic and contained in oxide.   Cobalt, met	TABLE 1 WINCE CI 1		tion of	1920	1720 6	172	-1921	
Cobalt, metallic and contained in oxide.  Copyret (b).  Fine ox.  From pig from Canadian ore.  Tons gif gif gif from Canadian ore.  Tons gif gif gif from Canadian ore.  Tons gif				1020	Per cent		1001	t er cent
Cobalt, metallic and contames in oxide.   Lb.   546,023   1,365,005   0.00   251,086   7.75,093   0.00   0.00   251,086   7.75,093   0.00   0.00   251,086   7.75,093   0.00			Quantity		of total	Quantity		of total
tained in axide				8			\$	
Iron pix from Camadian ore	tained in oxide	Lb.						0.44
Iron pix from Camadian ore	Copper (b)	Tino or						3 - 46
Iron or sold for export	Iron pig from Canadian ore							11.14
Noke   (1)	Iron ore sold for export	44	8,885	64,538		1,058	3,272	
Dallwidth   Crude on   Platinum (c)   Say 30,   Say 30	Lead (c)							2.23
Platinam (o)								
Silver (1)	Platinum (e)	44						
Total	Rhodium, Osmium, Iridium.							
Total	Silver (f)							4.94
Actisolite Tons Arsenie, white and in ore 2.459	Total		00,000,012					
Actinolite. Tons Assenie, white and in ore " 100				77,7600,000	94,70		431,040,232	20.70
Arsenie, white and in ore " 2, 459   447, 488   0.20   1, 491   233, 703   0.18   Ashastos " 199, 573   4, 792, 201   6-49   9, 276   4, 909   230   2.08   Barytes " 1751   229, 83   270   9, 507   Coral " 1, 1016   251, 379   0.11   2, 798   255, 666   Coral " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   255, 666   Corandum " 1, 1016   251, 379   0.11   2, 798   2, 798   2, 798   Corandum " 1, 1016   251, 379   0.11   2, 798   2, 798   Corandum " 1, 1016   251, 379   0.11   2, 798   2, 798   Corandum " 1, 1016   251, 379   0.11   2, 798   2, 798   Corandum " 1, 1016   251, 379   0.11   2, 798   Corandum " 1, 1016   2, 298   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   2, 298   Corandum " 1, 1016   2, 298   2, 298   Corandum " 1, 1016		Tons	100	1,160		78	975	
Barytes	Arsenic, white and in ore	44 %	2,459	447,848				0.14
Chromite.								2.85
Corandom								
Cornalum								42-14
Fine paper	Corundum,		196	24.547	, , , , , , , , , , , , , , , , , , , ,	403	55,965	
Crandstones   2.190   163,617   0.07   937   63,092	Feldspar		37,873					0.13
Grindstones	Graphite		2.190					0.08
Magnesitin sulphate	Grindstones		2.444	88,136				
Mannesium sulphate	Gypsum							1 - ()-1
Ming								
Mineral water								
Natural gas (g) M. eu. ft. 16,845,518   4,232,642   1.86   4,077,601   4,504,464   2.6   Oxides, iron. Tons 19,122   157,909   0.07   9,048   93,610   Petroleum, crude. Bbl. 19,251   18,650   1,666   6,664   Petroleum, crude. Bbl. 196,251   822,235   0.36   187,540   611,533   0.3   Phosphate. Tons   174,744   719,110   0.032   32,173   116,326   0.0   Quartz   128,295   467,821   0.21   190,350   312,947   0.1   Salt.   209,855   1,544,724   0.68   184,658   1,673,685   0.9   Sodium carbonate.   811   19,496   623   18,850   Strontium   75   75   76   106,934   0.07   10,124   144,565   0.0   Total   76   77   77   77   77   77   77   7	Mica		2,203	376,022			70,063	
Natural gas (g)	Almeral water			24,582				
Oxides, iron.   Tons   19,128   157,909   0-07   9,048   93,610	Natural gas (g)	M. cu. ft.	16.845.518	4. 232. 642	1-86			2.67
Petroleum crude		Tons						
Phosphate	Peat						6,664	**
Pyrites			196,251	822, 235	0.36			0.37
Capariz	Pyrites		174 744	710 110	0.39			0.07
Salt	Quartz	5.4						0.18
Sodium carbonate   "   81   19,496   623   18,850   Strontium   "   75   2,625   100,936   100,000   341   14,565   0.00   11,24   144,565   0.00   11,24   144,565   0.00   11,26   144,565   0.00   11,26   144,565   0.00   0.000	Salt							0.97
Strontium	Sodium carbonate					197		
Tale 21,671 100,934 0.07 10,124 144,565 0.0 Tripolite. 200 8,600 7341 11,268  Total 08,027,947 47.41 77.41 77.423 0.1 Clay products— Brick, common. No. 303,343,028 4,835,996 2.12 220,438,243 3,567,503 2.0 Brick, common. No. 303,343,028 4,835,996 2.12 220,438,243 3,567,503 2.0 Brick, pressed 8,5137,125 2,004,537 0.88 80,947,398 1,738,293 1.0 Brick moulded and ornamental 7. Tons 49,091 591,418 0.26 4,502,233 242,482 0.1 Fireclay blocks and shapes Fireclay blocks and shapes Fireclay blocks and shapes Fireclay blocks and shapes Fottery 209,171 0.09 231,262 0.1 Sewer-pipe Tons 58,887 1,549,600 0.68 1,666,584 0.9 Terra-cetta No. 14,527,000 562,652 0.25 473,952 0.2 Lime Bush 9,427,334 3,818,553 1.68 6,879,067 2.781,197 1.6 Sand and gravel Tons 1,530,795 4,291,067 1.88 11,574,862 2,537,249 1.4 State Tons 1,508,916 0.66 319,398 937,894 0.5 Stone— Grand tetal 224,598 100.00 17,099 23,202,45 515,044 2.0 Bandstone 7. Total 240,593 0.011 1,650 172,720 0.1 Sandstone 7. Total 27,896,695 100.00 171,993,240 100.00						623	18,850	
Tripolite	Tule				0.0"	10 101	144 505	0.00
Total	Tripolite	4.1			0.07			0.08
Cement, portland and puzzolan   Bbl.   6,651,980   14,798,070   6 · 49   5,752,885   14,195,143   8 · 2					47.41			51.09
Cement, portland and puzzolan   Bbl.   6,651,980   14,798,070   6.49   5,752,885   14,195,145   8.2								
Clay products	Propuers							
Brick, common.		Bbl.	6,651,980	14,798,070	6.49	5,752,885	14, 195, 143	8 - 26
Brick, pressed.  Brick moulded and ornamental.  "" 3,515,000 73,926		N'.	202 212 006	1 625 000	0.19	210 903 000	9 507 500	9.00
Brick moulded and orna-   mental								1.01
Firebrick			0.,101,120		0 00	00,011,000	4,100, MI	
Fireclay	mental		3,515,000	73,926				
Fireclay blocks and shapes Fireproofing. Tons Hollow building brick or blocks. No. 302,261 Fireproofing. Tons Sewer-pipe Tons Tons Sewer-pipe Tons Tons Sewer-pipe Tons Tons Tons Tons Tons Tons Tons Tons	Firebrick			471 110	0.01	4,502,233	242,462	0.14
Fireproofing. Tons 49,091 591,418 0.26 452,296 0.2  Hollow building brick or blocks. No. 302,261 0.13 3,627,777 177,273 0.1  Kaolin. Tons 383 15,022 124 1,888 209,171 0.09 231,262 0.4  Sewer-pipe. Tons 58,887 1,549,600 0.68 1,666,584 0.9  Terra-cotta. 46,745 134,193 0.0  Tile, drain. No. 14,527,000 562,652 0.25 473,952 0.2  Lime. Bush. 9,427,334 3,818,553 1.68 6,879,067 2,781,197 1.68  Sand and gravel. Tons 11,530,795 4,291,067 1.88 11,574,862 2,537,249 1.4  Stone—  Granite. Tons 1,508,910 0.66 319,398 937,894 0.5  Limestone. 1,508,910 0.66 319,398 937,894 0.5  Limestone. 1,508,910 0.66 319,398 937,894 0.5  Marble. 1,508,910 0.66 319,398 937,894 0.5  Sandstone. 1,508,910 0.66 319,398 937,894 0.5  Sandstone. 1,508,910 0.66 319,398 937,894 0.5  Marble. 1,508,910 0.66 319,398 937,894 0.5  Sandstone. 1,508,910 0.66 319,398 937,894 0.5  Sandstone. 1,508,910 0.66 319,398 937,894 0.5  Total 240,593 0.11 1,650 172,720 0.1  Sandstone. 1,508,490 0.5  Sands	A HERBITA	1 Ons		4/4,113	0.21	2,931		
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Fireproofing	Tons	49,091	591,418	0.26			0.26
Kaolin.         Tons         683         15,022         124         1,888           Pottery.         231,262         0-1           Sewer-pipe.         Tons         58,887         1,549,690         0-68         1,666,584         0-9           Terra-cotta.         46,743         134,193         0-0         134,193         0-0           Tile, drain.         No.         14,527,000         562,652         0-25         473,952         0-2           Lime.         Bush.         9,427,334         3,818,553         1-68,6879,067         2,781,197         1-68           Sand and gravel.         Tons         11,530,795         4,291,067         1-88 11,574,862         2,537,249         1-4           Slate.         14,200         22,325         22,325         22,325         1-4           Stone—         1,508,910         0-66         319,398         937,894         0-5           Granite.         Tons         1,508,910         0-66         319,398         937,894         0-5           Limestone.         5,665,693         2-49         3,322,024         5,155,646         3-0           Marble.         240,593         0-11         1,650         172,720         0-1	Hollow building brick or							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	blocks		209		0.13		177,273	0.10
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		10115	000		0.09	124	921 989	0.13
Total	Sewer-pipe	Tons	58.887	1,549,690				0.97
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Terra-cotta		14 839 400					0.08
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Line		0. 197 334			0 970 087	9 781 107	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							2, 537, 240	1.48
Stone—         Tons         1,508,916         0.66         319,398         937,894         0.5           Limestone.         " 5,665,693         2.49         3,322,024         5,155,046         3.0           Marble.         " 240,593         0.11         1,650         172,729         0.1           Sandstone         " 105,149         0.07         28,426         78,036           Total         "41,892,088         18.39         34,737,428         20.2           Grand total         227,859,667         100.00         171,923,842         109.0	Slate							
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Stone-							
Marble.     "     240,593     0+11     1,650     172,720     0+1       Sandstone     "     165,149     0+07     28,426     78,036       Total     "41,892,088     18-39     34,737,428     20+2       Grand total     "27,859,66"     100+00     171,923,442     109+0								0.55
Sandstone.     "     165.149     0·07     28,426     78,036       Total.     "41,892,088     18·39     34,737,428     20·2       Grand total.     "27,859,667     100·00     171,993,442     109·0								2-00
Total         '41,892,088         18-39         34,737,428         20-2           Grand total         '27,859,667         100-00         171,923,412         109-0		66						0-10
	Total			41,892,088	18.39			20-21
				227,859,665	100-00		171,923 7,19	109 00

<sup>\*</sup> includes "Sand-lime brick", 8724,918. † See notes on page 9.

# Comparative Table of Mineral Production of Canada in 1920 and 1921

TABLE 2

TABLE 2	-			-		
		Increase (- Decrease			Increase (4- Decrease (	
		Quantity	%		Value	17
METALLIC Cobalt, metallic and contained in oxide Lb.		294,037	53-85		609,100	44.62
Copper	-	33,979,871	41-64		8,290,662	58 - 20
iold. Fine oz.	+	161.322	21.09		3,334,822	21-09
ron pig from Casadian ore Tons	-	19,305	25.45		193,315	9.35
ron ore sold for export		7,827	88 - 09		61,266	94-93
end. Lb.	+	30,725,875 42,042,640	85 · 46 68 · 55		614,480	72 - 48
Nickel	_	322	35.27		20, 125	34-47
Platinium		303	50.92		15,770	41.85
Place inter		456	88-89		22,125	69 - 54
Silver Fine oz. Zine Lb.	+	212,841	1 - 60		4,964,975	25-91
Zinc Lib.	+	13, 225, 444	33 · (8	-	586,651	19-18
Total				_	28,596,398	36-69
Non-METALLIC Tong		22	22.00		185	15.95
Actinolite		968	39.37		214.085	17.80
Arsenic, white and in ore		106,812	53 - 52	- ra	9,885,971	66-87
Barvtes		481	64-05		13,416	58-31
AFOID HE	-	8.218	74-60		195,683	10-21
Coul	1-	1,574,456 207	9 - 47		8,242,067	127 - 99
Continuini		8,005	21 - 14		50.141	17-8
Feldspar		5,716	50.88		104, 179	43-3
Graphite	-	1,253	57-21		99,755	60-2
Frindstones  Typsum  Mngnesite	-	1.103	47 - 59		24,069	27-3
Sypsum	-	42,594 14,648	9 - 93		108, 453 434, 436	5·7 84·1
Magnesium sulphate	+	82	4.21		380	0.9
Magnesium sulphate. " Manganese. " Mica Col		581	89 - 52	-	7,629	69-1
Micn	-	1,501	68 - 13	-	305, 959	81.3
Mineral water	1:	30			2,866 1,500	11-6
Mineral Water   Can     Natural gas   Meu, ft     Oxides, iron   Tons     Peat   Petroleum, crude   Bbl.     Days   Tons     Debrooks   Tons     Debrooks   Tons     Tons	+	2,767,917	16-43		361,522	8-5
Oxides, iron		10,080	52.70		64, 299	40.7
Peat	-	2,884	63 - 38		(1,986	64.2
Petroleum, crude Bbl. Phosphate Tons	-	8,711	4 - 44		180,702 450	21.9
# [1177]111451 C	+	30 42,571	24-36	+	612.245	85·1
Pyrites		27,945	21 - 71		154, 874	33-1
Salt		45, 197	21.5	4-	128, 961	8-3
Souther carponate	+	197		+	14,775	2 0
Sodium sulphate		188 75	23 - 18	-	046 2,625	3-3
Strontium	-	11.547	53 - 25	2 _	22,369	13-4
Tripolite "	+	81	31 - 1.		2,668	31.0
Total				-	20, 194, 720	18-6
STRUCTURAL MATERIALS AND CLAY PRODUCTS						
Cement, Portland and puzzolan Bbl.	1000	899,095	13 - 51	2 -	602,927	4.0
Clay products-		00.001.001	0.00			20.0
Brick, common	-				1,268,493 266,244	26 · 2 13 · 2
Brick, pressed "Brick, moulded and ornamental "	-	4, 189, 727 1, 519, 716	43 - 2		23, 350	
Firebrick	. 1	1,010,110	7.9 6		217, 1300	
Fireclay Fireclay blocks and shapes	·   } .			-	110, 115	23-2
Fireclay blocks and shapes					139, 122	23 - 8
Fireproofing					124, 988	41.3
Kaolin Tons		559	81-8	1 -	13, 134	87
Pottery					22,091	10-3
Sewer pipe. Terra-cotta and tile other than drain.					117,494	7-3
Term-cotta and tile other than drain	1			+	87,450 88,700	187-0
LimeBush		2,548,267	27.0	3 -	1,037,356	
Sand and gravel	+	44,067		8 -	1,753,818	40.8
				+	8,125	57 -
Stone			11		571.022	37.
Granite Limestone					510,647	9.0
Marble					67,873	28-1
Sandstone					87,113	
						0 10 1
TotalGrand Total				.	* 7,154,660 55,936,323	



#### REPORT

OF THE

# MINERAL PRODUCTION OF CANADA

DURING THE CALENDAR YEAR, 1921

BY S. J. COOK, B.A., A.I.C. Chief of the Mining, Metallurgical and Chemical Branch

General Review.—The break in prices of most metals during the last quarter of 1920 foreshadowed a difficult year in the mining industry in Canada. In spite of these difficulties and although many hitherto thriving branches of the mining industry suffered severely during 1921, there were redeeming features, and the completed survey of the mineral production showed that the aggregate value of the economic minerals produced during the calendar year reached a total of \$171,923,342, as compared with \$227,859,665 in the preceding year, and comprised metallics valued at \$49,343,232; non-metallics, \$87,342,-682; and structural materials and clay products, \$34,737,428. 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 from Canadian ores smelted during the year, either in Canada or abroad and to compute the value of this production in each case at the average price of the refined metal in a recognized market. The value of the non-metallics, and of the structural materials was determined as the value received by the producer at point of shipment. In this report, no departure has been made from the practice previously followed. The New York market was used in the case of the principal metals since most sales of Canadian products are made on that market.

The readjustment which had set in during the closing months of 1920 continued throughout the greater part of 1921 and particularly during the first half of the year there was little constructive change in the market conditions governing the sales of most mineral products. The mining of coal and the production of gold and silver were industries which might be excepted from the foregoing statement.

Towards the close of the year mineral markets became somewhat more active, prices showed a slight tendency to rise and with the gradual absorption of stocks left over from the abnormal activities of the war period a general

improvement was observed.

The principal mineral producing province of Canada in 1921 was Ontario, the value of its mineral production being determined as \$57,356,651. British Columbia came second, with a mineral production valued at \$33,230,460; Alberta was a close third, with \$30,562,229; Nova Scotia ranked fourth, with \$28,912,111; Quebec was fifth, with \$15,157,094; and Manitoba, New Brunswick, Yukon Territory and Saskatchewan followed in the order named with productions between one and two million dollars each.

Notes on Tables 1 and 2.—(a) Copper, lead, nickel, silver and zinc are valued at the average price for the year of the refined metal. Pig-iron is valued at the furnace or spot, and non-metallics at point of shipment.

(b) Copper content of smelter products and estimated recoveries from ores exported at 17.456 cents in 1920 and 12.502 cents in 1921. (c) Pig lead produced in Canada and estimated recoveries from ores exported at 8.940 cents in 1920 and 5.742 cents in 1921 (Montreal prices). (d) Nickel content of natte produced and nickel recovered from silver-cobalt-nickel ores at 40 cents in 1920 and 35 cents in 1921. (e) Production from alluvial sands, Port Colborne and New Jersey refineries in 1920 and from alluvial sands, Port Colborne and Deschenes refineries in 1921. (f) Silver bullion marketed by producers and estimated recoveries from ores and smelter products exported at 100.90 cents in 1920 and 62.654 cents in 1921. (g) Gross returns from sales of gas (producers statements).

Seventeen products contributed 98 per cent of the total recorded value of the mineral production of Canada in 1921, and in order of the values assigned these were: coal, gold, portland cement, clay products, silver, nickel, stone, copper, asbestos, natural gas, lead, lime, sand and gravel, zine, iron, gypsum and salt. Production values of these commodities ranged from \$72,451,656 for coal down to \$1,673,685 for salt.

The output of coal while less than in the preceding year was still considerable, and the decline of 12 per cent from the quantity mined in 1920 was not sufficient to reduce the output to the level of 1919. Alberta and Nova Scotia were the principal producing provinces, Alberta being only slightly in advance of its eastern rival. Production continued in British Columbia at more nearly the same rate as in the preceding year than was the case in any of the other provinces. New Brunswick was the only province to exceed its 1920 output although Saskatchewan came within one per cent of the quantity mined in the preceding year. The mine operators in the several provinces have been fully alive to the necessity of seeking markets for their coal and in all the coal-producing provinces some attempt has been made to promote the coal trade. This statement is probably more particularly true of activities in Alberta where considerable work has been done with a view to establishing conditions under which Alberta coal might be moved east on a paying basis. An attempt was also made to obtain a share of the Pacific coast trade.

In value of production, gold ranked second during 1921 among the mineral

In value of production, gold ranked second during 1921 among the mineral products. Ontario was again the principal producer, and although the production of the mines was curtailed during the early months of the year owing to a shortage of hydro-electric power consequent upon a deficient water supply, the output at the standard rate of \$20.671834 per ounce reached a value of \$14.640.062. The most attractive feature of gold production was the fact that all gold sold to the Royal Mint at Ottawa was paid for in New York funds and the premium obtained added to the item "other income" very appreciably during the year. There was greater production of gold in British Columbia than in the preceeding year, but in the Yukon the recorded output of placer

gold was less than in 1920.

Fourteen (14) plants for the manufacture of cement were operated in Canada in 1921 and nine other plants equipped for the production of cement remained idle throughout the year. The output of cement was only slightly less than in the preceding year and amounted in all to 6,449,656 barrels, valued at over \$16,000,000. Sales, however, declined almost one million barrels from the record of 1920.

The manufacture of clay products in Canada including brick, firebrick, fireclay, fire-proofing, hollow building blocks, sewer pipe, pottery, terra-cotta and drain tile, involved a capital investment in 1921 estimated in excess of \$28,000,000 and accounted for products valued at nearly \$9,000,000. There was an appreciable decline in the production of every commodity in the list both in quantity and in value of sales, but in spite of this fact so widespread was this

industry in Canada that over 200 plants were operated during the year.

Silver ranked fifth among the mineral products of Canada during 1921, with a production about 1.6 per cent above the quantity recovered in 1920. The output was very creditable and was valued at \$8,485,355. The average price of silver throughout the year was less than two-thirds of that prevailing in 1920. For the first half of the year it averaged 59.81 cents and was fairly steady at this level. Later the price advanced slightly and production rose accordingly, especially in Ontario where the factor of declining costs had a greater effect than in the provinces where silver was produced principally as a by-product in the recovery of other metals. The four leading companies, the Nipissing, the Mining Corporation, the O'Brien and Coniagas were all active

at the close of the year and other properties were increasing their operations. In British Columbia more than 3,350,000 ounces was produced, over 48 per cent of which was contained in lead and copper bullion from the Trail and Anyox smelters. The greater portion of the remainder was recovered from exported ores.

Throughout the year the marketing of nickel was so difficult that operations at the mines were curtailed to approximately one-half the normal rate. From time to time the working forces were cut down. Early in the year the British America Nickel Corporation discontinued operations and later the International Nickel Company also found it necessary to close down. The Mond Nickel Company which operated throughout the year, did so far below capacity. The surplus stocks of nickel continued to be a deterrent factor to production and even at the close of the year it was difficult to foresee how much longer the industrial depression would be reflected in a low output of nickel.

The production of stone in Canada in 1921 amounted in value to \$6,343,696, a decline of more than \$1,125,000 from the value of the output in 1920. Ontario was the leading producer and accounted for approximately two-thirds of the total production. The comparatively small amount of construction carried out in 1921 was definitely reflected in the lessened production of stone for building

purposes.

The copper industry passed through a very trying period particularly during the first half of the year. Outstanding features were the closing down of the principal producing mines in the United States due to the falling-off in demand and the decline in sales to the lowest level since 1914. There was little change throughout the year in quotations. At the beginning of the year copper sold at 12·5 cents per pound on the New York market; in August the metal was quoted at 11·75 cents per pound with but few buyers. Towards the end of the year a remarkable recovery featured the copper market and by mid-December quotations rose to 13·75 cents per pound with some sales at 14 cents so that the year closed selling at its highest point. In spite of the exceptionally unfavourable conditions surrounding the copper industry, production of copper in Canada amounted to nearly 58 per cent of the production during the preceding year.

The mining and marketing of asbestos in 1921 declined to less than half the activity of the preceding year. Practically the whole of the Canadian production of asbestos is exported to the United States and thence to Europe. Owing to the adverse exchange situation between the countries of Europe and the United States, trading in asbestos was almost at a standstill throughout the year and although several mines were operated continuously, conditions gener-

ally were very dull

The next product of value in 1921 was natural gas, in the production of which three provinces participated, with Ontario in the lead and Alberta next, with a production in excess of one-half the quantity produced in Ontario but with a value of only 45 per cent of that of the natural gas sold in Ontario. New Brunswick also contributed. The decline in the production of natural gas in Ontario has been a matter of some concern, and steps have been taken by the Ontario Government to conserve the supply and to utilize it to the advantage of all concerned. A Natural Gas Commissioner has been appointed and charged with the duties of administering the supply by a special act of the Legislature put in effect last year to safeguard the interests of the people in this important field.

Notwithstanding the general decline in prices during the past two years the quantity of lead recovered increased more than 85 per cent above the quantity produced in 1920 and was valued at almost 20 per cent more than the output of that year. Practically the whole of the production was from the smelters

at Trail which were operated continuously. Some lead was also produced from

Ontario and Quebec ores.

The burning of lime in Canada is an old-established industry which in common with the other producers of construction materials was seriously affected by the depression in the building trades during the year. The output of lime while constituting 1.62 per cent of the total value of the mineral production of Canada in 1921, fell below the quantity made in the preceding year by almost one-third. The total value of the lime made in 1921 was \$2.781 197.

one-third. The total value of the lime made in 1921 was \$2,781,197.

More than \$2,500,000 worth of sand and gravel was marketed in 1921 and in view of the existing conditions this output may be considered quite satisfactory in spite of the fact that the production in the preceding year was valued at more than \$4,000,000. Owing to the widely distributed deposits of sand and gravel in Canada a great many pits were operated and the products included sands for building purposes, for foundry use, for the manufacture of glass, and also very largely for the ballasting of railroad beds and repairs to existing lines.

Zinc increased one-third in quantity but fell off 17 per cent in value as compared with the production in the preceding year. 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, although ores containing lead were

exported.

During 1921 the production of pig-iron from Canadian ores declined about one-third from the record of the preceding year, and the final totals showed that 56,564 tons of pig-iron was made. The Canadian furnaces depend very largely on imported ores, the furnaces in Ontario drawing from the famous Mesabi range while the Nova Scotia plants import their ore from Wabana, Newfoundland.

The production of gypsum in recent years has added to the mineral production of Canada and in 1921 the output was valued at \$1,785,538. Nova Scotia was the principal producer, although Ontario, Manitoba, and New Brunswick contributed appreciably towards the output. Some of the gypsum mined was sold

in the crude form but a large part was calcined for further use.

The salt wells of the Essex peninsula in Ontario marketed commodities valued at \$1,673,685, an increase of more than \$100,000 in value over the preceding year in spite of the fact that the actual tonnage was considerably less. The production of the salt industry as a whole accounted for 0.97 per cent of the value of the mineral production of Canada, as compared with 0.68 per cent of the total value in the preceding year.

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.

For the convenience of those who may desire to convert the values given in the tables to their equivalents in Canadian dollars for the years in which exchange premiums were a factor of importance, a table has been prepared which shows the amount paid in Canadian dollars for one American dollar during each month of the years 1920 and 1921. The figures given were obtained as the average of the maximum and minimum quotations for the month. In the table on metal prices the average prices of the principal metals for the past six years have been tabulated. The prices given for antimony, copper and silver on the New York market, spelter on the St. Louis market, lead on the Montreal market, nickel and cobalt at the average Canadian quotations for 1921, are the prices which have been used in this report in computing the value of the production of these metals from Canadian ores in 1921. Gold was as usual valued at \$20.671834 per fine ounce.

Mineral Statistics.—There is some variation in the methods used by the several Provincial Governments in computing the value of the metallic mineral output. In the province of British Columbia the accepted method is "to determine as the value of the metal production of the province the amount of ore for which the smelter or mill returns have been received during the year." In Ontario, the general plan is the same except that the Provincial Government officers do not complete the compilation of the final reports for the year until full returns have been received by the mine operators from the smelters to which shipments were made. The practice in Quebec and the other provinces are similar to that followed in Ontario.

There seems to be reasonably complete agreement between the representatives of each of the provinces and of the Dominion in regard to reports on the

production of non-metallic minerals and structural materials.

The apparent discrepancies between the mineral production reports issued from the Dominion Government and from the several Provincial Governments may be accounted for by the statement that different points of view have been held as to methods of procedure with the result that the questionnaires from the several offices have called for different information and even when the same data have been asked for, varying methods of compilation have been used in order to present to the reader the particular points of view held by the different offices.

The value of the mineral production of a province may be computed as the receipts by the mine and smelter operators from the mining and smelting industry in that province or it may be determined as the part of the world's mineral production contributed by the mines of the province. For many ores, return is made by a smelter for possibly one or two of the principal metals contained, and the mine operator is paid on this basis. Valuable by-products obtained by the smelter may be sold by it either as the finished product of commerce, or in the form of concentrates or residues. Again, as in the case of nickel, it may be that the Canadian smelter disposes of its product in the form of matte which has subsequently to be refined elsewhere.

The whole problem of the co-ordination of mineral statistics has been under study in the Bureau for some time and several improvements in procedure have

already been introduced.

In the present report there have been included in the sections relating to the mineral production of Canada by provinces, tables abstracted from the reports prepared by the provincial offices.

#### EXCHANGE TABLE

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

TABLE 3

Month	1920	1921
	\$	s
anuary	1-1056	1.143
'ebruary	1 - 1497	1 - 136
Jarch	1-1178	1 - 133
April	1-1112	1-121
fay	1 - 1134	1-116
une	1.13811	1 - 129
uly	1 - 1134	1 - 132
August	1 - 1275	. 1-110
September	1 - 1075	1-116
Detaber	1 - 1016	1 - 091
November	1 - 1231	1.090
December	1.1643	1 - 068
Average for the year	1-1227	1-116

#### Metal Prices

(In cents per pound or ounce)

	1916	1917	1918	1919	1920	1921
Antimony (ordinaries) Per pound	25.370	20.690	12 - 581	8 · 190	8-490	4 · 93
Cobalt, Canadian price " Copper, New York " Lead, "	27 · 202 6 · 858	27·180 8·787	24·628 7·413		17·456 7·957	12 · 50 4 · 54
" London" " Montreal" Nickel, New York"	6 · 715 8 · 513 45 · 000	50-000		6 · 960 45 · 000	8 · 219 8 · 940 45 - 000	4·9· 5·7 35·0
Silver, Per ounce Spelter, Per pound Spelter, St. Louis.	65 · 061 12 · 804 12 · 634	81-417 8-901 8-730	8 - 159	7 - 338	7 · 671	62-6
l'in. New York	43.480		(a) 88·750		48 - 273	28.5

<sup>\*</sup> Crandian vrice.

#### Annual Mineral Production in Canada since 1886

TABLE 5

Year	Value of production	Value per capita	Year	Value of production	Value per capita
	8	8		8	S
886		2.23	1904.		10-2
887,		2 · 23	1905		11-4
888		2.67	1906		12.8
889		2.96	1907.	86,865,202	13-7:
890		3.50	1908		13 - 11
891,		3.92	1909		13.7
892		3 - 39	1910.		14-9
893	20, 035, 082	4.04	1911	103, 220, 994	14.3
894	19,931,158	3.98	1912	135,048,296	18 - 3
895		4.05	1913	145, 634, 812	19-3
896		4.38	1914.		16-7
897		5-49	1915.		17.4
898		7.32	1916.	177, 201, 534	
899		9-27	1917.		23.1
900		12 - 04	1918		25.3
901		12-16	1919	176,686,390	
902		11.36	1920		
903		10.83	1921	171.923.342	

# Annual Values of Metallic and Non-Metallic Production since 1907

TABLE 6

		Non-M	etallic	
Year	Metallic *	Fuels and other non- metallics	Structural materials and clay products	Total
907. 908. 909. 910. 911. 912. 913. 914. 914. 915. 916. 916. 917. 918. 919. 920. 921.	\$, 42,426,607 41,774,362 44,156,841 49,438,573 46,105,423 61,172,753 69,361,351 59,386,619 75,814,841 106,319,365 106,455,147 114,549,152 73,262,793 77,939,630 49,343,232	\$ 31,275,546 32,142,784 31,141,251 37,757,158 34,405,960 45,080,674 48,463,709 43,467,229 43,373,571 53,414,983 63,354,363 77,621,946 76,002,087 108,027,947 87,842,382	\$ 12,863,049 11,339,955 16,533,349 19,627,592 22,709,611 28,794,869 30,809,752 26,009,227 17,920,759 17,467,186 19,837,311 19,130,799 27,421,510 41,892,088 34,737,428	\$ (a) 86,865,20 (a) 85,357,10 91,831,44 106,823,62 103,220,99 135,948,29 145,334,81 128,863,07 137,109,17 177,201,53 189,546,82 211,301,89 176,686,39 227,859,646,171,923,34

<sup>(</sup>a) Total includes \$300,900 allowed for products not reported.

# Mineral Production of Canada by Provinces, 1899-1921

TABLE 7

Calendar Year	Nova Scotia*	New Bruns- wick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	Yukon	British Columbi
1899 1900 1901 1902 1902 1903 1904 1905 1906	9,298,479	439,060 467,985 607,129 580,495 559,913 559,035	3,292,383 3,759,984 3,743,636 3,585,938 3,688,482 4,405,975	\$9,819,557 11,258,090 13,970,010 14,619,091 14,160,033 12,582,843 12,582,843 18,833,292 25,111,682		\$17, 108, 23, 452, 19, 297, 16, 127, 14, 082, 12, 713, 11, 387, 10, 092,	.330 .940 .400 .986 .613 .642		\$ 12,482,60 16,680,52 20,531,83 17,448,03 17,899,14 19,325,17 22,386,00 25,299,60
908 909 900 910 1911 1012 1913 1914 1915 1916 1917 1918 1919 1920	14,532,040 14,487,108 12,504,810 12,504,810 15,409,397 18,922,236 19,376,138 17,584,639 18,088,342 20,042,262 21,104,542 22,317,108 23,445,215 34,430,017 28,912,111	579,816 657,035 581,942 612,830 771,004 1,102,613 1,014,570 903,467 1,118,187 1,435,024 2,144,017 1,770,945 2,491,787	6,372,949 7,086,265 2,270,136 8,304,717 11,656,998 41,619,275 14,406,598 17,400,077 19,605,347' 21,267,947 28,886,214	43,538,078 42,796,162 51,985,876 59,167,749 53,034,677 61,071,287 89,066,600 94,694,093 67,917,998 81,715,808	584,374 1,193,377 1,500,359 1,791,772 2,463,074 2,214,496 1,318,387 1,823,576 2,628,264 3,120,600 3,120,600 2,868,378 4,223,461	456, 246 (498, 122 8 636, 706 (1, 165, 642 1) 881, 142 13 712, 313 13 451, 933 (590, 473 1)	5, 122, 505 8, 047, 447 8, 996, 210 6, 662, 673 2, 073, 589 5, 054, 046 2, 684, 234 0, 909, 347 3, 297, 543 8, 527, 535 3, 109, 987 1, 087, 582 3, 586, 456	3,669,290 4,032,678 4,764,474 4,707,432 5,933,242 6,276,737 5,418,185 5,057,708 5,491,610 4,482,202 2,355,631 1,940,934 1,576,726	23, 704, 03 22, 479, 00 24, 478, 57 21, 299, 30 30, 076, 63 28, 086, 31 24, 164, 03 28, 689, 42 39, 969, 96 36, 141, 92 42, 935, 33 34, 865, 42 39, 411, 72

<sup>&</sup>quot;Includes a small production from Prince Edward Island.

# Mineral Production of Canada by Provinces, 1919, 1920 and 1921

TABLE 8

D'	1919		1920		1921	
Province	Value of production	Per cent of total	Value of production	Per cent of total	Value of production	Per cent of total
	8		8		\$	
Nova Scotia	23,445,215	13.27	34, 130, 017	14.98	28,912,111	16.82
New Brunswick	1.770,945	1-00	2,491,787	1.09	1,901,505	1-10
Quebec	21, 267, 947	12-04	28, 886, 214	12-68	15, 157, 094	8 - 82
Ontario	67,917,998	38 - 44	81,715,808	35.86	57, 356, 651	33-36
Manitoba	2,868,378	1.62	4, 223, 461	1.85	1,934,117	1-12
askatchewan	1,521,964	0.86	1.837.468	0.81	1,114,220	0.63
Alberta	21,087,582	11.94	33,586,456	14.74	30,562,229	17 - 78
British Columbia	34, 865, 427	19.73	39, 411, 728	17-30	33, 230, 460	19.33
Yukon	1,940,934	1.10	1,576,726	0.89	1,754,955	1.02
Total for Canada	176,686,390	100.00	227, 859, 665	100.00	171, 923, 342	100.00

#### Mineral Production of Nova Scotia, 1919, 1920 and 1921

TABLE 9

	191	9	192	0	1921		
	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		8			
Metallic-							
Gold	850	17,571	690	14,263	*465	9.09	
Non-metallic-	Acre	41 154	me.	22 000	ama		
Barytes Tons	468		751		270		
Coal	0,720,378	22,078,726	6,429,291	32,238,129		27,782,050	
Feldspar "	283	0.000	011	0 4 70	16		
Grindstones "			211	8,410	183		
Gypsum. "	163,852		260,661		206,831		
Manganese	45		62	4,140	68	3,40	
PHIL	174		3,023		2,638		
Triponte	565	11,300	260	-8,600	341	11.26	
Structural materials and cloy products—							
Lime Bush.	366.543	73,309	201,500	40,300	25.914	6.08a	
Stone. Tons		413, 194	201,000	420, 175	58.923		
Other products					1111111111111	† 431,789	
volter protettees		120,000		2207, 121		1 401,100	
Total		23,445,215		34 120 017		99 019 119	

The total production of blast furnace pig-iron in Nova Scotia in 1919 was 285,087 tons valued at \$7.44,-641; in 1920 it was 332,493 tons valued at \$7.687,614 and in 1921, the production was 169,504 tons valued at \$3,633,516.

#### Mineral Production of Nova Scotia as reported by the Department of Public Works and Mines, Nova Scotia, year ending September 30, 1919-20-21

Mineral	Unit of Measure	1919	1920	1921
Coul	long tons	5,004,757	5,678,970	5,373,230
Pig-iron.	short tons	334,500	280,586	158,611
Steel ingots		374,888	361.742	203,662
Coke		518,713	382,608	233,799
Limestone and dolomite		353,379	249,993	78,932
Gypsum (crude)		48,868	174,520	185,934
Gypsum (calcined)	14	7,107	5,089	16.415
Building stone		7,450	8,040	4,507
Grindstone		300 12.894,550	18, 350, 354	11 000 700
Brick (common	number			11,993,790
		605.872	33,604 1,164,270	307, 614 826, 254
Drainpipe and tile	short tons			2.351
	short tons		947	1.570
Fireelay ground	46	1,362	850	1.650
Gold	ounces	935	744	379
Arsenic concentrates	short tons	200	500	312
Manganese ore	altol C bons		100	450
Barytes	16	50	550	350
Salt	44		3.095	2,606
Ammonium sulphate	11	6, 698	6,023	4.314
Benzol	Imp. gals.		236,583	389.499
Tolaol	21	19,638	107, 522	29,820
Solvent naplitha	16	20,000	37,466	12,708
Tar	16		4.610.243	3,618,400
Hollow building blocks	short tons			244
Moulding sand	- 14			396
Square flue linings	46			607
Segmental sewer blocks				803
	44			300
Infusorial earth, manf	T. 1			
Motor fuel	Imp. gals.			292, 452
Iron ore (imported)		646, 028	599,099	311,952
Ferro-manganese (imported)	long tons	1.111	7.840	2.079

<sup>\*</sup> Includes 25 oz. silver, value \$16. †Includes railway ballast from P.E.I., \$1,433.

# Mineral Production of New Brunswick, 1919, 1920 and 1921

TABLE 11

Dendons	1919		1920		1921		
Product	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$	
Non-metallic:	100 100	E04 E01	100 010	4 055 000	107 100	000 000	
Coal Tons	179, 108	794, 761	166,048	1,055,286	187, 192	920, 666	
Grindstones	1,737	51,516	2,233	79,696	1,098	57,077	
Gypsum	42,409	315,656	49,405	428, 183	54,030	360,220	
Natural gas, M cu. ft.	682,890	120,510	682,502	130, 506	708,743	139, 373	
Petroleum Bbl.	4,225	13.141	5.148	19,963	7,479	33.022	
Structural materials:-					, , , , ,		
Clay products		52 041		73.484		66,600	
Lime Bush	468,533	223, 193	701,859	365,030	562,447	203.084	
Stone				280, 167	15,125	97, 290	
Other products		13,933		59,472	239, 192	24,171	
Total		1,770,945		2,491,787		1.901,505	

# Mineral Production\* of Quebec, 1919, 1920 and 1921

TABLE 12

D., J., 4	191	9	199	20	192	
Product	Quantity	Value	Quantity	Value	Quantity	Value
Metallic:-		8	93.1	\$		\$
CopperLb.	2,691,695	503, 105		153,724		44,045
Gold Ozs.	1,470	30, 388	955	19,742	635	13, 127
Iron ore, sold for export Tons	321	1,005	960	3,000		
LeadLb.	2.280.000	158,825	905, 472	80,949		34.215
Molybdenite	83.002	69,203				01,21
Silver Ozs.	140,926	156,600	61,003	61,552	38,084	23, 861
ZineLb.	1.752,000	128, 562	1,120,200			
Non-metallic:-						
Ashestos and ashes-						
tic Tons	159.236	10,975,369		14,792,201	92,761	4,906,230
Chromite,	8,541	228,898	11,016	251,379	2,798	55, 696
relaspar	924	13,073	649	10,052	9,737	80,180
Graphite	20	400		31,913	38	2,428
Magnesite	11,273	328, 465	18,378	512,756 281,460	2,927	74,109
Mica		218, 437	24,219	10, 109		41,172 7,278
Mineral water Gal.	11,862	113,427	19, 128	157,909	8,879	92.765
Iron oxides Tons	486	4,811	10,120	101, 303	0,010	34, (Us.
Peat	22	300			30	450
Pyrites	52,746	203, 222	14,817	44, 451		10.463
Ouartz	2.221	7,773		5,558	5,994	29,824
Tale	2,221		150	1.050		20,021
Structural materials:-				.,		
Cement Bb1.	2,260,422	4,340,010	3,013,463	6,545,054	2,135,631	5,410,275
Clay products		1,563,832		2, 361, 007		1,742,872
Knolin Tons	759	13.744	683	15,022	124	1,888
LimeBush.	1,796,822	493,762	2,108,203	826,044	2,040,451	790,508
SlateSquares.	1,632	10,853.	(a)	14,200	(b)	22,325
		1,441,919		2,189,325	719,499	1,662,641
Other products		248,707	,	431,826	(c) 700,669	110,752
.5 . 1		01 067 04		00 998 014		15 157 004
Total	*********	21, 207, 947		25,080,214		15, 157, 094

There is also in this Province an important production of aluminium from imported ores.

(a) 1,532 squares, and 240 tons of crushed material.

(b) 415 squares and 2,232 tons crushed material.

(c) Sund and gravel only in 1921.

# Mineral Production of Quebec, 1919, 1920 and 1921, as reported by the Quebec Bureau of Mines

Items	191	19	192	0	192	1
Items	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		*
Asbestos Tons	135,861	10,932,289	179,891	14,749,048	84,475	5, 199, 78
Asbestic"	23,827	63,011	19,716	43,559	12,397	14,53
hromite "	8,184]	223,331	10,585	247,730	1,893	22,68
opper and sulphur ore "	53,965	447,623	15, 186	98,854	1,986	10,46
eldspar	1,684	25, 409	5 849	11, 252	9,797	79,73
Anolin			874	16,681	158	1,98
lold Oz.	1,446	29,420	935	19,346	648	12,31
iraphite Lb.	20	400	466,420	31,913	84,684]	2.43
ron ore	,		960	2,999		
litaniferous iron ore	0.040	000 540	100 011	210 22	4 604	
dagnesite	9,940	283,719	17,941	512,755	4,984	74,11
Warl	0.000.000	000				***************************************
dien. Lb.	3,853,265	224,988	1,496,399	281,729	288, 197	42,2
dineral water Gals.	30,519	12,608	20,811	9,962	14,621	5, 3;
lineral paints (iron	4.0 (31)77	111 01	10 105	100.000	0.004	00.5
oxide, ochre) Tons	11,937	111,645	19, 185	136,098	8,894	90,70
MolybdeniteLb.	83,002 486	69, 203				
Peat Tons	201	4,811 300			30	4
'hosphate	201	900				
Dolomite	15,055	50.161	24,865	60, 147	1,167] 6,496	8, 04 29, 94
Quartz and silica Oz.	127,223	141,373			39,327	
			57, 514 150	58, 032 1, 050		21,3
	5.318	103, 138	3,015	56.927	15.500	18.00
Zinc and Lead ore "	0,010	100, 100	9,019	00,927	10,000	10,00
Building Materials						
Brick M	94, 312	1, 179, 624	129.440	1,956,473	78,665	1.198.45
ementBbl.	2,250,152	4, 337, 572	3, 103, 463	6,545,053	2, 135, 131	5, 410, 2
Granite	-, 400, 104	334.692	0, 100, 100	494.372	2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	369, 13
ime Bush.	2, 124, 898	521.031	60,301	682, 477	54,920	624,5
imestone Tons	708, 172	916, 776	988.209	1,584,316	1,007,733	1.523.0
larble, C. ft.	19, 201	192,489	25, 250	228, 353	1,155	167.6
and, building Tons	486.877	180.987	397.505	206, 433	596,673	283.8
andstone	720	3.850	20, 139	21.910	295	2.3
late Square	1.632	10,853	20,100	14.200	6.086	48.7
lile, drain and sewer pipe,	A 1 57120	*01000		1,200	0,000	107
pottery etc		412,367		321,270		280,7
porture of the second						
Total		20,813,670		28, 392, 939		15,522,98
		-310111010		Tologat and		T. LOWBID!

# Mineral Production of Ontario, 1919, 1920 and 1921

	191	9	1	920	192	1
Product	Quantity	Value	Quantity	Value	Quantity	Value
Metallics		\$ .		\$		8
Cobalt, metallic and				A COE DEC	054 000	Ext DEO
in oxide Lb.	530,371 24,346,623	1,325,928 4,550,627	546,023 32,059,993	1,365,058 5,596,392	251,986 12,821,385	755, 958 1 602 930
CopperOzs.	505,739	10, 454, 553	564, 995	11,679,483		14,640,062
Iron ore, sold for	500,700		=			
export Tons	5,562	45,520	6,683	54,266	48	242
Iron, pig, from Can-	90 45	000 100	75 000	0.000.007	EC EC4	1 079 600
adian ore (a)	38,457 1,487,586	899,406 103,625	75,869 2,255,520	2,066,997 201,643	56,564 3,312,493	1,873,682 $190,203$
Nickel	44, 544, 883	17,817,953	61,335,706	24,534,282	19,293,060	6,752,571
PlatinumCrude oz.	25	1,447	578	36,961	269	20, 184
Palladium	62	3,534	913	58,392	591	38,267
Rhodium, ruthium.			513	31,815	57	9,690
Silver Ozs.	12,117,878	13,465,628		9,996,795		6, 116, 037
Zinc Lb.	147,692	10,838	13,950	1,070		
Non-Metallics						
Actinolite Tons	80	880		1,160		973
Arsenious oxide	2,859	488,706		425,617	1,491	233,763 55,963
Corundum	13,754	73,158	196 37,224	24,547 270,843		150, 45
Feldspar	3,425	59,281	3,758	68,475		1,74
Craphita	1,340	99,821	1,957	133,704		63, 439
Gypsum	58,899	278, 120		404, 162		433,053 28,893
Mica	325	55,351 55,958	1,466	94, 562 14, 473		14,438
Mineral water Imp. Gal. Natural gasM.cu.ft.	11,024,041	2,690,400	10,529,374	2,920,731	8,422,774	3,080,13
Post 10ns	500	1,750		18,650		6,66- 559,198
Petroleum 1501.	219,804	625,342		726,286	172,859	0.00, 100
Phosphate Tons Pyrites	117,011	285,832		618, 283		101,300
Quartz	60,055	179,549		321,063		220,80
Salt	148, 112	1,395,291		1,512,724 2,625		1,649,62
Strontium	18.542			162.784		140,39
Tate	20,012					
Structural Materials and Clay Products						
Cement Bbl.	2,023,280	3,650,585	2,035,594	4,377,814		
Clay products	O pelo co	4,574,796	5 100 000	5,613,488		5, 183, 12 1, 344, 18
LimeBush	3,578,834 24,141,399	1,143,973		1,962,086 451,175		1,022,10
Sand-lime brick No. Stone		1,936,268		4,035,478	2,716,080	4, 167, 58
Other products		1,192,510		1,931,924		1,496,729
		67 017 000		81,715,808	3	57, 356, 65
Total	1	67,917,998	3	01,110,000	4	1000106

<sup>(</sup>a) The total production of blast-furnace pig-iron in Ontario in 1919 was 624,993 tons, valued at \$17,104,151; in 1920, 749,068 tons, valued at \$22,252.062 and in 1921, 494,001 tons valued at \$11.856,352.

(b) Sand and gravel only in 1921.

Mineral Production of Ontario, 1919 and 1920, as reported by the Ontario Department of Mines TABLE 15

	=		ment of 1		-	
Products	19	19	19	20	*19	21
* ICAHOGO	Quantity	Value	Quantity	Value	Quantity	Value
Gold. Ozs. Silver. "	505,964 11,363,252	\$ 10,451,709 12,904,312	565,283 11,065,415			\$ 14,624,085 5,497,160
Copper in matte  (a) Short tons  Nickel in matte (a) "  Iron ore, export-	15,581	2,740,663 7,990,403	21,371	10,685,500	3.686 4.850	737,142 1,939,851
ron, pig (a) " Lead, pig Lb. Copper, blister " Nickel, metallie " Nickel oxide " Platinum metals Ozs.	5, 953 46, 769 1, 529, 987 5, 684, 183 10, 202, 308 1, 498, 577 1, 770	48,341 1,200,793 94,507 = 969,024 3,592,984 341,833 200,000	4,890,571	2, 204, 205 179, 714 1, 041, 994 3, 852, 141 1, 151, 490	100 82,838 3,570,222 3,070,719 5,439,147 1,402,019 915	459 2, 079, 729 190, 843 356, 708 1, 825, 359 285, 321 51, 069
Cobalt, metallie Lb. Cobalt, oxide " Other cabalt com-	121,926 426,573 199,487	243, 554 624, 553 141, 372		1,210,810	32,718 155,551 108,814	98,228 354,418 114,069
Nickel sulphate and carbonate	353,267	46,711				
Total metallic		41,590,759		48, 281, 553		27,574,202
Non-Metallic Tons	160	1,176	100	1, 160	78	975
Arsenic, crude and white. Lb.	5, 668, 170	485, 360	3,781,389	432, 434	2,982,525	233,763
Brick, common, M Brick, fancy and	141,255	1,966,711	123,551	2,209,265	99, 463	1,743,094
rile, drain " Tile, hollow build-	31, 738 13, 009	539,908 354,700	32,559 9,784	809, 126 359, 373	31,481 9,910	673, 087 250, 040
ing	17,435	184,900 1,692	58.737	)		211,529
Sower pipe Bbl. Corundum Tons	2,022,575	119,551 609,100 3,659,720	2,035,594 196	127.049 860,811 4,377,814 27,000	2,723,072 402	67,985 939,464 6,425,266 50,250
Fluorspar	14.787 3,425	88,663 60,389	37, 335 3, 704	268, 295 67, 381	15,506 115	114,059 1,744
refined	1,340	99,841	1,956	132,882	363	23, 273
Lime Bush. Mica Tons Mineral water. Tup, gals.	59,899 117,178 3,911,572 567 276,833	278,111 366,422 1,268,290 56,199 19,290	74,707 148,651 4,982,912 719 127,150	404, 162 618, 283 1,799, 763 54, 169 15, 059	84,765 19,375 2,610,143 222	433,053 91,604 1,172,680 29,630 9,000
Natural gas M. cu. ft. Peat. Tons Petroleum, crude Bbl. Phosphate apatite). Tons	11,085,819 500 220,100 2	2,583,324 1,750 632,789 31	10,545,000 3,900 181,750	3, 163, 500 15, 600 724, 145	8,590,000 500 172,859	2,953,000 2,000 466,716
Quartz (silica)	59,658 148,112 1,065,851 27,661	179,070 1,395,368 501,666 367,815	94,650 206.612 2,162,241 27,703	366,441 1,544,867 1,390,704 407,766	12,957 149,599 1,412,956	74,635 1,509,287 668,098 456,700
fall erude and		1,230,922		3, 944, 972		1,812,863
round Tons	17,571	240,399	20,359	306, 319	9,967	140, 300
Total non-metadic Add metallic		17,293,157 41,590,759		24,707,969 48,281,553		20,554,185 27,574,202
Grand total		58,883,916		73,079,522		48, 128, 387

<sup>(</sup>a) Copper and nickel in the matte valued at 14 and 25 cents per pound respectively in 1910 and 10 and 20 cents in 1920.
(b) Total shipments of iron ore, 195,919 tons valued at \$688,452, in 1919 and 126,710 tons valued at \$510,000 in 1920.

<sup>(</sup>c) Production from Ontario ore only. Total output of blast furnaces, 623,586 (one of pig iron, worth \$16 010 537, in 1010 and 748,173 tens worth \$21,552,308 in 1520.

Proliminary figures subject to revision.

# Mineral Production of Manitoba, 1919, 1920 and 1921

TABLE 16

75 - 1		1919		192	0	1921	
Product		Quantity	Value	Quantity	Value	Quantity	Value
Metallic			8		8		\$
ooper	Ozs.	3,348,000 724 20,760	625,775 14,966 23,069	3,062,577 781 15,510	534,604 16,145 15,649	207 33	4, 279
A on-Metallic			371,337	44,371 200	487,894 60	40,859	480, 28
Service al Materials Clay Products							
ine er lucts	Bush. No. Tons	476,452 7,389,300	147,131 124,847 89,067	10,278,802	210,984 197,734 374,286	413,283	208,98 136,37 56,66 1,047,45
Total			2,868,378		4, 223, 461		-1,934,1

# Mineral Production of Saskatchewan, 1919, 1920 and 1921

Tanca IV

The Land		1919			0	1921	
Product	Quantit	У	Value	Quantity	Value	Quantity	Value
Nun-Metallic			8		8		8
Magazanin sulphate	ns 380,		820, 522	343, 475 2	819,320 103	335, 632 2 33	823, 180 120 790
roomm sulphate	t	15	450	811	19,496	624	18,850
Structural Materials and Chy Products	l						
Clay products				0.050 500			166, 244
Sand-lime brick (a) N			14,601 415,402	2,258,500			105,036
Total		1	, 521, 964		1,837,468		1,114,22

<sup>(</sup>a) Sand-lime brick not included under Mineral Production in 1921.

#### Mineral Production of Alberta, 1919, 1920 and 1921

TABLE 18

	191	9	192	0	1921	
	Quantity	Value	Quantity	Value	Quantity	Value
Metallic		\$	P-HA	\$		\$
Gold, alluvial Ozs.	24	500			49	1,013
Non-Metallic						
Coal	4,964,535 8,230,838 16,437	18,294,495 1,365,127 97,841	6,833,500 5,633,442 11,032	1,181,345	4,945,884	27,246,514 1,374,599 49,313
Structural Materials and Clay Products						
Clay products. LimeBush. Sand-lime brick.No. Stone Other products.	109,067 729,000	41,276 10,206 3,189		72,477 40,626 4,415	107,083 2,962	710,477 48,332 13,750 1,118,231
Total		21,087,582		33,586,456		30,562,229

# Mineral Production of British Columbia, 1919, 1920 and 1921

TABLE 19

I SHUE 10						
Product	19	19	19	20	19	21
r roduct	Quantity	Value	Quantity	Value	Quantity	Value
Metallic		8		8	THE	8
Copper (a)	44,502,079 167,252	8.317,884 3,457,406	45,319,771 124,808	7,911,019 2,580,010		4,306,580 3,117,147
port	40,060,113	2,150		7,272 2,931,670 719	60, 298, 603 23	3,030 3,462,346 1,726
ZineLb.	3,713,537 30,295,015	4,126,556 2,223,048			3,350,357 53,089,356	2,099,133 2,471,310
Non-Metallic			440			
Arsenic	530 2,435,933 1,638	12,420,445	2,858,877 7,477	16,726,950 171,971		134,523
Manganese " Magnesium sulphate " Magnesite "	616 738	10,559 9,115	587 1,945	6,889 39,783		39,386
Mineral water					30 169	1,500
Oxides (iron)	6,730 32,715	33,650 340,313	11.275	56,376 141,200	3,597	4,557
Ta)e	100		110	3, 100		4, 175
Structural Materials and Clay Products				Halle I		
City products		293,478 187,963 217,006 373,193	561,305	596, 172 341, 632 276, 505 1, 270, 298	199,341 142,041	415,869 252,636 229,163 925,361
Total		34,865,427		39,411,728		33, 230, 460

<sup>(</sup>a) Smelter recoveries of copper.

#### Quantities and Values of Mineral Products of British Columbia for 1919. 1920 and 1921, as reported by the B.C. Bureau of Mines

TABLE 20

	Customary Measure	19	19	19	20	19	1921	
		Quantity	Value	Quantity	Value	Quantity	Value	
			\$		\$		\$	
Gold placer	Pounds	152, 426 3, 403, 119 42, 459, 339 29, 475, 968 56, 737, 651 2, 267, 541 91, 138	3,150,645 3,592,673 7,939,896 1,526,855 3,540,429 11,337,705 637,966	120,048 3,377,849 44,887,676 39,331,218 47,208,238 2,595,125 67,792	2,481,392 3,235,980 7,832,899 2,816,115 3,077,979 12,975,625 474,544	135, 663 2,674, 389 39, 036, 993 41, 402, 288 49, 419, 372 2, 483, 995 59, 434	2,804,154 1,591,201 4,879,624 1,693,354 1,952,065 12,419,975 416,038	
Total			33,296,313		35, 543, 084		28,066,641	

# Mineral Production of Yukon, 1919, 1920 and 1921

					ı,
П	5		-1	3	

	1919		192	0	1921	
Product	Quantity	Value	Quantity	Value	Quantity	Value
Metaille		\$		\$		3
Copper         1.b.           Gold         1)zs.           Silver         "           Lead         Lh.	105, 184 90, 705 27, 556	30,874 1,875,039 30,621	277,712 72,778 19,190	48,478 1,504,455 19,363	65, 994 393, 692 2, 472, 615	1,264,21 246,28 141,97
CoalTons	1,100	4, 400	763	4,430	233	2,47
Total		1.940,934		1,576,762		1,754,98

# **METALLICS**

#### ALUMINIUM

No commercial ores of aluminium have as yet been found in Canada. Aluminium is however, made extensively at Shawinigan Falls, Quebec, by the Northern Aluminum Company, from bauxite ores imported from the United States. A wire mill for the manufacture of aluminium wire and cables is also operated by the same firm. Bauxite is used in the manufacture of artificial abrasives as well as a source of aluminium.

There being but one firm engaged in the manufacture of aluminium in

Canada, statistics of production may not be separately shown.

Imports of alumina, including bauxite, and exports of aluminium are, however, published in the reports of the External Trade Branch of the Dominion Bureau of Statistics. During the twelve months ending December 31, 1921, the imports of alumina were 15,024.5 tons, valued at \$638,483, as against 57,414.3 tons, valued at \$1,889,064, in 1920.

The imports of aluminium in ingots, bars, tubes, etc., in 1921, were 740.280 pounds, or 370 tons, valued at \$221.427, besides manufactures of aluminium valued at \$356.217, or a total value of \$1,550,277. In 1920, imports totalled 1,870,736 pounds or 935 tons of alumina, valued at \$633,733, and manufactures of aluminium valued at \$589,106; a gross value of \$1,222,839 for the year.

The exports of aluminium in ingots, bars, tubes, etc., in 1921 amounted to 5,399,800 pounds or 2,699 9 tons, valued at \$1,259,703, together with manufactures of aluminium valued at \$273,401; as against 19,716,300 pounds or 9,858 tons, valued at \$6,094,628, and manufactures valued at \$175,057 in 1920.

The manufacture of aluminium cooking utensils in Canada has been considerably developed during the past few years. There are now some eight firms engaged in the industry, which is described in a special report by this Bureau.

Imports of Alumina and Aluminium into Canada and Exports of Aluminium during 1919, 1920, 1921

Table 22

1	191	9	192	0	1921		
Item	Pounds	Value	Pounds	Value	Pounds	Value	
		8		5		5	
Alumina	58,603,100	1,565,264	114,828,600	1,889,064	30,049,100	638,483	
Ingots, blooms, bars	749,455 19,518	237,475 10,090 252,065	20,049	623, 232 10, 501	724,434 15,846	213, 136 8, 291 258, 885	
Leaf foil						97,332	
Total		2,150,958	4	3,111,903	[NE//	1,216,127	
Fronts— Aluminium—							
Manufactures		4,455,031 59,339	19,716,300	6,094,628 175,057	5,399,800	1,259,702 273,401	
Total		4,514,370		6, 269, 685		1,533,104	

#### Average Monthly Prices of Ingot Aluminium<sup>1</sup>

(At New York in cents per pound)

TABLE 23

	1917	1918	1919	1920	1921
January February March April May June July August September October November December.	60·77 59·00 59·00 59·92 59·84 60·00 55·48 48·88 43·64 38·90 37·22 36·40	37·5 37·0 32·0 32·0 33·0 33·0 33·0 33·0 33·0 33	33 · 00 32 · 26 29 · 81 30 · 67 32 · 22 32 · 83 32 · 57 32 · 50 32 · 50 32 · 50 32 · 48	32-00 31-83 31-50 31-61 31-95 32-00 32-00 32-21 31-44 29-13 27-80 23-83	27 · 00 28 · 00 28 · 00 28 · 00 28 · 00 28 · 00 26 · 40 24 · 50 24 · 50 24 · 50 24 · 50 24 · 50 25 · 95

<sup>&#</sup>x27;From the "Engineering and Mining Journal," 1917 and 1918; and from the "Metals Statistics" for 1919

#### ANTIMONY

Until the year 1917 the production of small quantities of antimony, either as ore, or as a constituent in the residues from the lead refining at Trail was more or less consistent. Since that time no production has been reported. The producers of this metal are the Consolidated Mining and Smelting Company. Trail, B.C., and the Antimony Products Corporation, formerly the North American Smelting Corporation, Limited, Lake George, N.B. This latter company which was re-organized early in 1922, expected to commence operations during that year.

The imports of antimony and antimony salts in 1921 were 640,578 pounds, valued at \$40,127, as against 1,079,216 pounds, valued at \$97,288, in 1920. exports of antimony ore or regulus have been reported for the past twenty years.

Production of Antimony in Canada, 1886-1921

Calendar Year	Antimo	ny ore	Refined regulus	
Calendar 1 car	Tons	Value	Pounds	Value
		\$		\$
6	665	31,490		
7	584	40 000		
8,	345			
9	55	1,100		
0	261	625		
1	10	60		
2 to 1897				
8	1,344	20,000		
9 to 1904				
5 (a)	527			
6 (a)	782			
7	2,016	65,000	63,850	5, 1
8 (b)	148	5,443		
9	35	1,575	61,207	4,5
0	364	13,906		
1-1914				
5,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1.341	81,283	, 59,440	11.3
6	885	94,537	107,183	41.8
7	361	22,000		

<sup>(</sup>a) As recorded by the North Scotta Department of Mines; no value sites at (b) Experts.

# Imports into Canada and Exports of Antimony, 1907-1921

TABLE 25

	T				Imports						
Calendar Year	Exports of antimony ore		Antimony or regulus of		Antimony salts		Total imports				
	Tons	Value	Pounds	Value	Pounds	Value	Pounds	Value			
	- 41	8		\$		5		\$			
1913	1,149 794 774 26 56		551,354 388,952 561,046 998,045 667,050 648,516 1,962,194 796,728 332,137 648,882	69,447 28,509 37,362 25,296 36,405 60,456 49,408 47,498 344,918 203,450 61,732 92,678 81,257 86,803	117, 592 29, 832 40, 176 94, 330 18, 420 55, 683 23, 649 45, 634 67, 956 41, 985 12, 292 34, 921 19, 063 20, 067,	19,083 2,452 4,369 9,152 2,418 7,197 2,421 10,217 10,320 13,891 6,295 18,986 8,548	483, 282 579, 466 1,053, 728 690, 699 694, 150 2,030, 150 838, 713 344, 429 683, 803 1,041, 850	88,530 30,961 41,731 34,448 38,823 67,653 51,829 57,715 355,238 222,341 68,027 111,664 89,805 97,288			

Prices—The average price of antimony over the months of 1921 was 4.957 cents per pound, as against 8.485 cents in 1920. The market for the metal was steady during the first quarter of the year with the price slightly over five cents per pound. For the remainder of the year the price declined gradually to 4½ cents with market conditions declining and weak.

# Average Prices of Antimony\*, 1917-1921

(In cents per pound at New York)

TABLE 26

	1917	1918	1919	1920	1921
. Addressed	Ordinaries	Ordinaries	Ordinaries	Ordinaries	Ordinaries
January	17 - 29	14-281	7.43	10.58	5 · 20
February	29 · 80	13-823		11.59	5 - 23
March	32.89	13.091	6.80	11.06	5 - 25
April	34 - 04	12 - 536		10.50	5-1-
May	25.20	12.840		9.66	5 · 2:
une,	19.51	13.055		8 · 29	5.0
uly	15.83	13 - 197	8-99	7.50	4-7
August	15.06	14-000		7.18	4.6
September	14.94	14 - 145		7-11	4 - 5
October	14.75	13.319	8-71	6.72	5-1)
November	13.91	8.771	9-11	6-11	4 - 7
December	15.06	7.915	9.63	5.53	4 - 50
	20 - 69	12-581	8.19	8.49	4.9

<sup>\*</sup>As given by the "Engineering and Mining Journal". "Ordinaries" stand for: Hungarian, Chinese or other "Foreign" brands.

#### COBALT

The major portion of the world's supply of cobalt for almost two decades has been derived from the silver-cobalt-nickel arsenides of the Cobalt districts.

During 1921 three smelters in Ontario treated ores and residues from this district producing cobalt oxide, metallic cobalt, cobalt sulphate, cobalt carbonate, cobalt hydroxide, unseparated oxides and stellite (an alloy of cobalt used for high speed tool metal). The cobalt residues, which in past years were largely exported, were mainly treated in Canada during 1920 and 1921. In the latter year considerable shipments were made abroad. The total production in 1921 of cobalt contained in smelter products shipped, and cobalt residues exported, amounted to 251.986 pounds, which at \$3 per pound would be worth \$755,958, as against 546,023 pounds at \$2.50 per pound, valued at \$1,365,058 in 1920.

# Summary of Cobalt Production Statistics, 1919, 1920 and 1921

200				-	-
	9	- 1	804	2	
8.	- 2	٠.,	471	-0107	4

	1919	1920	1921
Cobalt ores and residues treated	9,084	8,988	5, 141
Cobalt content of ores and residues treated Lb.	1,070,826	1,200,040	131,678
Cobalt recovery from smelter productsLb.	530, 371	546,023	196, 160
Value	\$1,325,928	\$1,365,058	\$566,511
Metallic cobalt produced	113,943	166,375	32,718
Value	\$220,676	\$389,708	\$98,228
Cobalt oxide produced Lb.	429, 359	536,457	165,554
Value	\$611,909	\$1,170,288	\$354,418
Other cobait compounds	\$34,308	\$600	
Mixed oxide (cobalt and nickel)			105,673
Value			\$113,867

#### Production of Cobalt in Canada, 1912-1921

Table 28

Calendar year	Pounds	Value	Average price per pound	Calendar year	Pounds	Value	Average price per pound
1912 1913 1914 1915 1916	663,093 865,937 871,891 504,212 840,536		1.10	1917	1, 079, 572 737, 157 530, 371 546, 023 251, 986	\$ 1.727,315 1.842,893 1,325,928 1,365,058 755,958	2 50 2 50

# Shipments of Metallic Cobalt and Cobalt Compounds, 1917-1921

TABLE 29

Calendar Year	Metallic (	'obalt	Cobalt	-oxide	Other cobalt compounds	Total Value
	Pounds	Value	Pounds	Value	Value	
		\$		\$	8	\$
1917 1918 1919 1920 1921	393,773 294,476 113,943 166,375 32,718	616, 633 713, 072 220, 676 389, 708 98, 228	802,447 476,053 429,359 536,457 165,554	1,104,500 760,121 611,909 1,170,288 354,418	740,032 936,139 34,308 600 113,865	2,461,165 2,210,350 866,893 1,560,596 566,511

The total amount of cobalt ores and residues treated in 1921 in the Ontario smelters and including that exported, amounted to 5,288 tons with a cobalt content of 187,499 pounds, or an average cobalt content of 1.8 per cent, as against 8.988 tons in 1920 containing 1.200.040 pounds of cobalt, or an average cobalt content of 6.7 per cent.

#### Ores and Residues of Cobalt treated, 1917-1921

TABLE 30

Year	Quantity (Tons)	Cobalt contents (Pounds)	Cobalt %
1917	7,770	866, 327	5.6
1918 •	8,354	972,679	5.8
1919	9.084	1,070,826	5.9
1920	8,988	1,200,040	6-7
1921	5,288	187,499	1.8

# Production of Cobalt in Ontario, 1904-1921

(As reported by the Ontario Bureau of Mines)

Year	Tons Value		Year	Tons	Value	
		s			5	
1904 1905 1906 1907 1908 1909 1910 1911 1912 1913	16 118 321 739 1,224 1,533 1,098 852 934 821	19,960 100,000 * 80,704 104,426 141,118 94,965 54,699 170,890 314,381 420,386	1914	(a) 351 (b) 206 (b) 400 (b) 337 (b) 380 (b) 298 (b) 283	590, 406 383, 261 805, 614 1,138, 190 1,640, 310 1,019, 479 1,605, 365	

Metallic content of cobalt exists.
 Metallic content of all cobalt as pounds.
 Information not available.

#### Operations of Ontario Silver-Cobalt Refineries, 1917-1921

(As reported by the Ontario Bureau of Mines)

TABLE 32

Year	Ores,			Products	Shipped		
	etc.,	Cobalt oxide		Cobalt salts		Cobalt metal	
	Tons	Pounds	Value	Pounds	Value	Pounds	Value
			\$		\$		- \$
917	7,964 8,366	418,703 477,583	533,489 727,170	52,485 48,513	13, 211 25, 180	396,395 404,248	589,29 887,96
919	8,260	426,573	634,553	66, 193	46,615	121,926	243,55
920 921*	8,988	559, 182	1.210,810	1,717	1,629	167,750	392,93

<sup>\*</sup> Information not available.

#### Imports of Cobalt into the United States, 1917-1921\*

TABLE 33

Year	Cobalt, cobs		Cobalt oxide	
1 ear	Pounds	Value	Pounds	Value
		s		8
1917	223,794	369,950	276,406	275, 821
1918	504,391	628,099	208.596	291,699
1919	77,556	144, 282	131, 424	184,751
1920	156,862	331,672	202,704	399,605
1921	46,099	108,774	164.003	342, 426

<sup>\*</sup>Preliminary Report on Mineral Resources of United States, 1919. Most of the cobalt used in the United States has been imported from Canada. All the cobalt and cobalt oxide imported in 1919 is thought to have come from Canada.

(a) Includes cobalt oxide.

# Exports of Cobalt from Canada, 1917-1921

TABLE 34

	Metallic C		Oxides a	Oxides and Salts		Alloys		General ore	
Year	Pounds	Value	Pounds	Value	Pounds	Value	Pounds	Value	
		\$		\$		8		\$	
1917 1318 1219 1520 1521	282, 951 292, 015 106, 835 304, 382 60, 035	748,705 259,624	468, 225	853,737 731,506	73,580 3,402 10,219	298,496 14,878 43,970		1,006,008	

<sup>(</sup>a) Covers the last 9 months in 1917—no exports recorded for the first quarter of 1917.

# Imports of Cobalt into Canada, 1917-1921

Year	0	re	Oxides of Cobalt, Tin and Copper, n.o.p.	
i ear	Pounds	Value	Pounds	Value
1917		\$	153,682	\$ 77,368
1918 1919			142,407 112,104	72,989 44,414
1920. 1921.	600 100	520 131	255,854 119,092	125, 159 40, 730

Uses.—Prior to the war the principal demand for cobalt in the form of oxide was for colouring in the ceramic industry. A small demand for cobalt metal now exists for use in making high-speed tools, such as "stellite" an alloy of cobalt, chrome, and tungsten, or molybdenum. A small amount is used for plating and for making salts, such as cobalt sulphate and cobalt carbonate, and also for making cobalt hydroxide. Small amounts of cobalt are also used in the form of cleate and resinate of cobalt as a drying agent in the manufacture of paints and varnishes.

Prices.—The market for cobalt which was very poor in 1915, gradually improved during the war. No quotations on the New York markets were available during 1918, 1919 and 1920 and a nominal Canadian price of \$2.50 per pound has been used in this report. During 1921 the quotations given in the Engineering and Mining Journal-Press ranged from \$3 to \$3.50 per pound the former value has been used.

#### Monthly Average Prices of Cobalt in London\*

TABLE 36

(In shillings per pound)

Month	. 1918	1919	1920	1921
January February March April May June July August September October November December	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0/- 12/6-13/- 0/- 12/6-13/- 0/- 12/6-13/- 0/- 12/6-13/- 0/- 12/6-13/- 0/- 12/6-13/- 0/- 12/6-13/- 2/6 12/6-13/- 2/6 12/6-13/- 2/6 12/6-13/- 2/6 12/6-13/- 2/6 12/6-13/-	10/6 10/6 14/- 14/- 14/-	30/- 30/- 25/- 20- 19, 6 16/3 17/- 17/- 15, 6 15/-

<sup>\*</sup>Published by The Metal Information Bureau, Limited, 7 East India Ave., London, E.C.

Bounties.—Under the provisions of the "Metal Refining Bounty Act," passed by the Ontario Legislature in 1907, bounties were paid to refineries amounting to \$126,987.08 on cobalt metal, cobalt oxide, and salts of cobalt, and \$43,153.85 on nickel metal, nickel oxide, and salts of nickel, or a total for both robalt and nickel of \$170,140.95. The quantities produced and the bounties paid each year are given in detail in the annual reports of the Ontario Bureau

The bounty was at the rate of six cents per pound on the metallic contents of the oxides. The Act which expired in April, 1917, and was not re-enacted, was quoted in the Annual Report on Mineral Production of Canada for the calendar year 1914.

The results of researches on cobalt and cobalt alloys, undertaken for the Mines Branch by Dr. H. T. Kalmus, at Queen's University, have been published in five parts.1

<sup>1</sup> Mines Branch No. 259, "Preparation of Metallic Cobalt by Reduction of the Oxide," Report on by

II. T. Kalinus, B.Sc., Ph.D. Mines Branch No. 334, "Electro-plating with Cobalt." Report on by H. T. Kalinus, B.Sc., Ph.D. 1915. Mines Branch No. 309, "The Physical Properties of the Metal Cobalt." Report on by H. T. Kalinus,

Mines Branch No. 411, "Cobalt Alloys with Non-Corrosive Properties." Report on by H. T. Kalmus,

B.Sc., Ph.D.

Mines Branch No. 413, "Magnetic Properties of Cobalt and of Fe<sub>2</sub>Co." Report on by H. T. Kalmus, B.Sc., Ph.D.

A special report on the subject of cobalt has also been published by the Ontario Bureau of Mines. 1

#### COPPER

#### CANADA

The production of copper during 1921 amounted to 47,620,820 pounds, which at the average New York price for the year (12.502 cents per pound) was worth \$5,953,555, as against 81,600,691 pounds, valued at \$14,244,217, or an average price of 17.456 cents per pound in 1920. The decrease amounted to 41.64 per cent in quantity and 58.2 per cent in total value.

The 1921 production included: (a) 32,122,678 pounds contained in blister

copper, a part of which was exported and a part was refined in Canada; (b) 12,645,391 pounds contained in nickel-copper matte, some of which was exported and some refined in Canada; (c) 162,111 pounds contained in copper sulphate; and (d) 2,690,640 pounds, the estimated recoveries from ores and concentrates exported for smelting and refining.

The corresponding figures for 1920 were (a) 31,481,884, (b) 32,000,079,

(c) 44,766; and (d) 18,073,962 pounds.

Refined copper was produced commercially in quantity for the first time in Canada in 1916 at the Trail Refinery of the Consolidated Mining and Smelting Company. The copper rod mill completed early in the year was not operated throughout 1921. The British America Nickel Corporation produced refined copper at their Deschenes plant for the first time in 1920. The total production of refined copper in Canada during the past six years was as follows: 1916—483 tons; 1917—3,901 tons; 1918—3,809 tons; 1919—3,467 tons; 1920-2.590 tons and 1921-2.143 tons.

Summary of Copper Statistics for Canada, 1919, 1920 and 1921 TABLE 37

	1919	1920	1921
Ores and concentrates shipped (a)		987,506	1,042,135
\Value	. \$9,265,569	\$5,522,350	\$2,589,314
Copper production	37,527	40,800	23,810
Value	. \$14,028,265	\$14,244,217	\$5,953,555
Production by provinces:—			
Quebec. Lb.	2,691,695	880,638	352,308
Ontario	24,346,623		
Manitoba	3,348,000		
British Columbia	44,502,079	45, 319, 771	34,447,127
Yukon"	165, 184	277,712	
Imports of copper (b)	15,395	24,561	5,833
Value		\$10,736,206	
Exports of copper			
\Value	. \$14,654,640	\$15,877,306	\$7,455,794

(a) Does not include the nickel-copper ores, but only the copper-gold-silver ores with also small

shipments of copper ore. See Nickel.

(b) Includes manufactures of copper for which no quantities are given; in 1919, \$455,023; in 1920, \$989,957, and in 1921, \$641,845; includes also copper ores in 1919, 1,685 tons valued at \$78,983; 1920, 1,220 tons valued at \$57,640, and in 1921, 1,375 tons valued at \$48,015.

<sup>1</sup> Report of Ontario Bureau of Mines. Vol. XXVII. Part III, Sec. 1. "Cobalt, its Occurrence, Metallurgy, Uses and Alloys," by Chas. W. Drury, 1919.

#### Production of Copper in Canada, 1886-1921

TABLE 38

Calendar year	Pounds	Value	Cents per pound	Calendar year	Pounds	Value	Cents per pound
		\$				8	
1886. 1887. 1888	3,505,000 3,260,424 5,562,864	385,550 366,798 927,107	11 · 00 11 · 25 16 · 66	1904 1905 1906	41,383,722 48,092,753 55,609,888	5,306,635 7,497,660 10,720,474	15-590
1889 1890 1891	6,013,671 9,529,401	936, 341 947, 153 1,226,703	13 · 75 15 · 75 12 · 87	1907 1908 1909*	56,979,205 63,702,873 52,493,863	11,398,120 8,413,876 6,814,754	13-208 12-982
1892 1893 1894	7,087,275 8,109,856 7,708,789	818,580 871,809 736,960	11 · 55 10 · 75 9 · 56	1910	55, 692, 369 55, 648, 011 77, 832, 127	7,094,094 6,886,998 12,718,548	12·376 16·341
1895	7,771,639 9,393,012 13,300,802	836, 228 1, 021, 960 1, 501, 660	10·76 10·88 11·29	1913 1914 1915	76, 978, 925 75, 735, 960 100, 785, 150	11,753,606 10,301,606 17,410,635	13 - 602
1898	17,747,136 15,078,475 18,937,138	2,134,980 2,655,319 3,065,922	12 · 03 17 · 61 16 · 19	1915 1917 1918	117, 150, 028 109, 227, 332 118, 769, 434	31,867,150 29,687,989 29,250,536	27 - 180
1901 1902 1903	37,827,019 22,804,259 42,684,454	6,096,581 4,511,383 5,649,487	16 · 117 11 · 620 13 · 235	1919 1920 1921	75, 053, 581 81, 600, 691 47, 620, 820	14,028,265 14,244,217 5,953,555	18 · 691 17 · 456

The decrease is not as large as the figures would indicate because of the calculation of part of the 1909 production on a different basis from previous years.

The production by provinces was as follows: British Columbia, 72-3 per cent of the total for Canada, as against 55-5 per cent in 1920; Ontario, 26-9 per cent, as against 39-3 per cent in 1920; Quebec, 0-8 per cent, as against 1-1 per cent in 1920. Manitoba and the Yukon which were credited with 3-8 per cent and 0-3 per cent respectively in 1920, did not produce any copper in 1921.

Production of Copper in Canada by Provinces, 1919, 1920 and 1921
Table 39

Decesions	191	9	1920		1921	
Province	Pounds	Value	Pounds	Value	Pounds	Value
Quebec Intario Manitoliu British Columbia Yukon.	2,691,695 24,346,623 3,348,000 44,502,079 165,184	\$ 503, 105 4,550,627 625,775 8,317,884 30,874	880, 638 32, 059, 993 3, 062, 577 45, 319, 771 277, 712	\$ 153,724 5,596,392 534,604 7,911,019 48,478	352,308 12,821,385 34,447,127	\$ 44,04. 1,602,930 4,306,580
Total	75,053,581	14,028,265	81,600,691	14,244,217	47,020,820	5,953,55

# Percentage of Copper Production in Canada by Provinces

1123				
T	A.R.	04.1	4	0

Province	1919	1920	1921
Quebec	3·6 32·5 4·4 59·3 0·2	1 · 1 39 · 3 3 · 8 55 · 5 0 · 3	0·8 26·9 72·3
Total	100-0	100-0	100 0

Exports and Imports.—The exports and imports of copper are given below. It should be pointed out that the data given on copper imported during the war years are incomplete due to the fact that a large quantity of copper, imported for war purposes, was entered under the account of the Imperial Government and for customs purposes was included with many other products in one item. Imports of brass are included in the section on zinc.

Imports into Canada and Exports of Copper, 1919, 1920 and 1921 Table 41

	191	9	1920		1921	
	Pounds	Value	Pounds	Value	Pounds	Value
l mports—		8		\$		s
Pigs, ingots or in blocks Old and scrap Manufactures of copper— Bars, rods, sheets, tube	3,042,197 1,010,000	659,214 138,023	9,236,575 2,481,100	1,784,370 404,161	925, 452 307, 900	135,563 37,955
and wire	26, 266, 918	5,665,502				3,080,833
Other manufactures	50	455, 0231	18	889,997	375	522, 327 74
Copper sulphate	1,874,801	150,388	2,365,535	192,900	1,929,256	127,359
Total		*7.147,783		*10,736,206		*3,952.218
Exports—				1		
Fine in ore, matte, regulus, etc	40,851,300	5,316,151	47,329,700	5,918,782	10,511,500	1,029,220
bars, sheets, etc	18, 192, 300	4, 186, 549 537, 225	2,666,500		3, 253, 600	497,383
Old and scrap	3,117,000 19,956,100	3,747,355	774,400 38,198,900		1,571,100 33,078,700	161,378 5,164,915 569,648
Total	82,176,700	14,654,640	88,969,500	15,877,306	48,414,900	7,455,794

<sup>\*</sup>There are also imports of copper ore and concentrate and of sub-acetate of copper, which are not included in this table, and which were not given separately previous to April, 1919. The imports in 1919, which cover 9 months only were: copper ore, etc., 3,369,100 pounds valued at \$78,983, and sub-acetate of copper, 1,344 pounds valued at \$630. The imports in 1920 were: copper ore, etc., 2,440,000 pounds valued at \$57,640, and sub-acetate of copper, 3,657 pounds valued at \$1,147. In 1921 the imports were 2,750,000 pounds copper ore valued at \$48,015 and 256 lbs, sub-acetate of copper valued at \$92.

Prices.—Trade conditions were severely affected by the fall in prices during 1920. In 1921 the average price for the twelve months was 12.502 cents with markets inactive. The prevailing monthly prices as published by the Engineering and Mining Journal-Press for the past three years, are shown as follows:—

# Monthly Average Prices of Electrolytic Copper in New York (In cents per pound)

Months	1919	1920	1921
January February March April May June July August	(a) 16.763 14.856 15.246 15.864 17.610 21.604 22.319	18-918 18-569 18-331 18-660 18-484 18-065 18-576 18-346	12·597 12·556 11·976 12·438 12·742 12·697 12·170 11·634
September October November December Yearly average	21·755 21·534 19·758 18·295	18 · 144 15 · 934 14 · 257 13 · 188	11 · 948 12 · 673 13 · 035 13 · 555 12 · 502

<sup>(</sup>a) No market.

# Monthly Average Prices of Standard Copper in London

(In £ Sterling per ton of 2,240 pounds)

Tant n 43

Months	1919	1920	1921
anuscy	92 - 238	118-095	70-964
obraary	78-700	120 - 188	70-925
Carch	76-821	109 - 533	67 - 563
Npril	77:300	103-028	69-381
day	77 - 767	96.750	73-196
lune	83 - 062	87 - 864	71-85:
uly	99-576	90 - 148	71 - 155
August	97 - 300	93 - 935	68-61
eptember	100-767	96-381	67-97
Petober	103-418	93-327	67-32
November	98-894	84 - 807	66-61
December	103.708	75-702	65.70
Yearly average	90.796	97 - 480	gn 95

#### QUEBEC

The production of copper in Quebec in 1921 was mainly derived as in the past from the copper pyrite ores of the Eastern Townships. The Weedon Mining Company only, reported operations; the Eustis mine which was active in 1920 was idle throughout the entire period. The total production amounted to 352, 308 pounds valued at \$44,045 as against 880,638 pounds valued at \$153,724 in 1920.

This production represents the estimated recovery during the year from 516 tons of ore and from 4,216 tons of cinder shipped to United States smelters. During the year, the total mine shipments were 1,986 tons of ore, of which 1,470 tons was treated in Canada primarily for its sulphur content in the manufacture of sulphuric acid, while the balance was smelted directly in United States smelters for the copper contained.

# Production of Copper in Quebec, 1886-1921

Taura 11

7 - 112	Pounds	Value	Year	Pounds	Value	Year	Pounds	Value
1885 1887 1888 1889 1859 1850 1850 1854 1892 1894 1895 1896 1897	3,340,000 2,937,900 5,562,864 5,315,000 4,710,606 5,401,704 4,883,480 4,468,352 2,176,430 2,242,462 2,407,200 2,474,970	330, 514 927, 107 730, 813 741, 920 695, 469 564, 042 480, 348 208, 067 241, 288 261, 903	1902 1903 1904 1905 1906 1907 1908 1909	760,000 1,621,243 1,981,169 1,517,990 1,282,024 1,038,212	$\frac{97,455}{252,752}$	1919 1920 1921	4,197,482 5,703,347 5,015,560 5,869,649 2,691,695 880,638	725, 115 1,551,424 1,368,229 1,445,577 503,105 158,724
1809 1809	2, 100, 235 1, 622, 560	252, 658) 237, 494	1913	3, 282, 210 3, 455, 887	536, 346 527, 679		93, 407, 653	16,498,566

#### ONTARIO

Most of the copper produced in Ontario is closely allied to the production of nicker and is derived principally from the nicker-copper ores of the Sudbury district. The decline in the demand for nicker during the year therefore had the effect of reducing the quantity of copper produced much below the average. During 1921 the copper production in Ontario amounted to 12.821,385 pounds

valued at \$1,602.930, as against 32,059,993 pounds valued at \$5,596,392 in 1920. Detailed statistics for copper from the nickel-copper ores are given under the item nickel, while the nickel-copper industry is described as a whole in the second part of this report.

# Production of Copper in Ontario, 1886-1921

TABLE 45

Year	Pounds	Value	Year	Pounds	Value	Year	Pounds	Value
1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898	165,000 322,524 1,466,752 1,303,065 4,127,697 2,203,795 3,641,504 5,207,679 4,576,337 3,167,256 5,500,652 8,375,223 5,723,324	36, 284 201, 678 205, 233 531, 234 254, 538 391, 461 497, 854 492, 414 344, 598 621, 023 1, 007, 539	1903 1904 1905 1906 1907 1908 1909 1910 1911 1912	6, 740, 058 8, 695, 831 7, 408, 202 7, 172, 533 4, 913, 594 8, 779, 259 10, 638, 231 14, 104, 337 15, 005, 171 15, 746, 699 19, 259, 016 17, 932, 263 22, 250, 601 17, 932, 253	1,401,507 861,278 949,285 630,070 1,368,68¢ 2,050,838 2,821,432 1,981,883 2,044,237 2,453,213 2,219,297 3,635,971	1919	39, 361, 464 44, 997, 035 42, 867, 774 47, 074, 475 24, 346, 623 32, 059, 993	12, 240, 094 11, 651, 461 11, 593, 502 4, 550, 627 5, 596, 392 1, 602, 930

The bounty offered by the Ontario Government on copper, 95 per cent pure and on copper sulphate produced from ore mined and refined in the province was never gained, and the act known as the "Metal Refining Bounty Act" warranting this bounty which expired April 10, 1917, was not re-enacted. The text of the act was quoted in the Aunual Report on the Mineral Production of Canada. 1914, page 60.

#### MANITOBA

Copper was produced in Manitoba for the first time in 1917 and then continuously until 1920, but in 1921 with increasing costs of operating, high freight rates and other transportation difficulties, it was found impossible to operate and no copper ore was shipped in that year. The record to date is as follows: 1917—1.116.000 pounds valued at \$303,329; 1918—2.339,751 pounds valued at \$576,234; 1919—3.348,000 pounds valued at \$625,775; and 1920—3.062,577 pounds valued at \$534,604.

The above amounts were estimated as the copper recovered from ores shipped by the Mandy Mining Company operating near Schist Lake, in The

Pas District of Northern Manitoba.

Much development has been carried on in this district during the past seven years. Towards the end of 1919 the Mandy Mining Company suspended operations, and has since sold its equipment, which has been installed on the Flin Flon group of claims on Flin Flon Lake in the same district. None of these copper properties reported any production during 1921. The Mining Corporation of Canada, which has secured a controlling interest in the Flin Flon group, carried on extensive development work by sinking and cross cutting, verifying the results of previous diamond drilling and proving large tonnages of ore to be in place.

A branch extension of the Hudson Bay Railway and smelter works are required for the economic treatment of the copper ores of this district.

<sup>&</sup>lt;sup>1</sup> Report on the Schist Loke District, Northern Manitoba, by Dr. E. L. Bruce. Summary report of the Geological Survey of Canada for 1917, part D.

### BRITISH COLUMBIA

The production of copper from British Columbia in 1921 amounted to 34,447,127 pounds, valued at \$4,306,580, as against 45,319,771 pounds valued at \$7,911,019, in 1920. The annual production from the province was 72-3 per cent of the total production for Canada in 1921 and 55-5 per cent in 1920.

This production included the copper content of the blister copper produced, which was partly refined at Trail and partly exported for refining in the United States; the copper equivalent of the copper sulphate produced at Trail and the estimated recoveries of copper from ores and concentrates exported, but it did not include the copper derived from the treatment of foreign ores or from ores of other provinces which were treated in British Columbia smelters.

## Production of Copper in British Columbia, 1894-1921

r	Ī	*	١	1	1	1		1	ŕ	
	٠			۰		9.		٠		

Year	Pounds	Value	Year	Pounds	Value	Year	Pounds	Value
		8			8			8
1899* 1900* 1901*	9,977,080 27,603,746	415,459 601,213 874,783 1,359,948 1,615,289 4,448,896	1906* 1907* 1908 1909 1910 1911 1912	37,692,251 42,990,488 40,832,720 37,041,115 35,658,952 35,270,006 35,279,558 50,526,656	8, 287, 706 8, 168, 177 4, 892, 390 4, 629, 245 4, 492, 693 4, 366, 198	1916 1917 1918 1919 1920 1921	63,642,550 57,730,959 62,865,681 44,502,079 45,319,773 34,447,127	17,312,046 15,691,275 15,482,560 8,317,884 7,911,019 4,306,580
1902* 1905*	34, 359, 921	4,547,735			6,991,916 5,606,636 9,793,714		930, 206, 139	162,404,308

Metal contents of ores shipped as published by the Provincial Bureau of Mines.

Since 1909 the method of compilation of statistics of copper production by the Provincial Bureau of Mines of British Columbia, has been based upon ore shipments from the mines. The value of the product has been obtained by taking the amount of copper actually recovered thus covering smelter losses, a method which gives a result usually approximating that obtained by the Dominion Bureau of Statistics.

# Production of Copper by Districts in British Columbia, 1919, 1920 and 1921\*

In Pounds

TABLE 47

	1919	1920	1921
Cariboo Ominees	16,205		26,000
Cassiat— Atlin, Liard and Stikine Skeena. East Kootenay—		26, 153, 406	25,664 34,816,103
Fort Steele		1,953	
Stocan. Nelson. Trail Creek.	21, 984 1, 112, 133	7.55	
Yule— Boundary Asheroft and Kamloops	3,273,655 556,681	260,808	
Similkameen Sonthern Coast— Vancouver Island Mainland	5, 180 432, 252 16, 629, 848		44,770
Totals.	42,459.339		

<sup>&</sup>quot;As published by British Columbia Burgan of Mines

Copper mining is one of the most important sections of the industry in the province, and in 1921 it contributed about 28 per cent of the total value from the metalliferous mines.

The main production in British Columbia is derived from the mines of the Pacific Coast and Cassiar district. Due to the recent slump in metal prices the copper industry has experienced a severe decline and many mines which

produced ore in 1919 and 1920 were closed down in 1921.

Of the important producers, the Granby Consolidated Mining, Smelting and Power Company operated its Hidden Creek Group, and the Consolidated Mining and Smelting Company of Trail operated the Rossland group of mines. During the period the Emma Mine, an important shipper, operated by the latter company was closed down and dismantled. The Britannia Mining and Smelting Company which suffered a disastrous fire early in the year when the plant was destroyed, continued to ship from stocks. The Belmont Surf Inlet continued to operate, while the Marble Bay properties of the Tacoma Steel Company remained idle throughout the period.

### YUKON

No production of copper was reported during 1921 from the Yukon District. During the war and when more favourable markets were to be had the production amounted to between one and two million pounds and occasionally higher. The following table shows the production.

# Production of Copper in Yukon to 1921

TABLE 48

Year	Pounds	Value	Year	Pounds	Value
1906 (and previous) 1907 1908 1909 1910 1911 1912	286,000	36, 431	1914 1945 1946 1977 1918 1919 1920 1921	1,367,050 533,216 2,807,096 2,460,079 619,878 165,184 277,712	\$ 185,946 92,113 763,586 668,656 152,666 30,876 48,478
			Total		

### GOLD

### CANADA

The production of gold from all sources in Canada during the calendar year 1921 amounted to 926,329 fine ounces, valued at \$19,148,920, or an increase of slightly over 21 per cent above the previous year, when 765,007 fine ounces,

valued at \$15,814,098 was produced.

The production for 1921 was derived from (a) alluvial gold, 77,246 ounces; (b) gold obtained from milling ores, 711,121 ounces; (c) gold obtained from ores treated at Canadian copper and lead smelters, 52,822 ounces; and (d) the estimated gold recoveries from ores and concentrates exported, 85,140 ounces. The corresponding figures for the year 1920 were: (a)83,469, (b) 581,455, (c) 45,886 ounces, and (d) 54,197 ounces.

The production of gold by provinces was: Nova Scotia 439 ounces or .05 per cent of the total for Canada; Quebec, 635 ounces, or .07 per cent; Ontario, 708,213 ounces, or .76.45 per cent; Manitoba, 207 ounces, or .02 per cent; Alberta, 49 ounces; British Columbia 150,792 ounces, or 16.27 per cent; and

the Yukon Territory 65,994 ounces or 7.14 per cent.

The large increase in the production of gold was due primarily to the expansion of the operating gold mines in Ontario, the output from which exceeded the 1920 record by over 25 per cent. With the opening up of some new producing mines, British Columbia's production increased by about 20 per cent although some mines, formerly important producers, remained idle. Nova Scotia, Manitoba and Quebec all showed considerable decreases in gold production.

## Production of Gold in Canada, 1858-1921

Table 49

Year	Fine ounces‡	Value	Year	Fine ounces‡	Value	Year	Fine ounces‡	Value
		\$			\$	11		S
1858	34, 104 78, 129 107, 806 128, 973 135, 391 202, 498 199, 605 192, 898 152, 555 145, 775 134, 169 102, 720 83, 415 105, 187 90, 283 74, 346 97, 856 130, 300 97, 729 94, 304 74, 420 76, 547	1, 615, 072 2, 228, 543 2, 666, 118 2, 798, 774 4, 186, 011 4, 126, 199 3, 187, 502 3, 153, 597 1, 274, 348 2, 174, 442 1, 866, 321 1, 866, 321 1, 536, 871 2, 022, 862 2, 023, 533 2, 020, 233 1, 949, 444 1, 538, 394	1881 1882 1883 1884 1885 1886 1887 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1900 1900 1900 1900 1901 1902	1,028,529 1,350,057 1,167,216	1, 246, 268 1, 113, 246 1, 1058, 436 1, 148, 829 1, 463, 190 1, 187, 804 1, 098, 610 1, 295, 159 1, 149, 776 930, 614 907, 601 976, 803 1, 128, 688 2, 083, 674 2, 754, 774	1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920	684,951 556,415 405,517 476,112 453,865 493,707 473,159 611,885 802,973 773,178 918,056 930,492 738,831 699,681 766,764	16, 462, 517 14, 159, 193 11, 502, 12, 12, 12, 12, 12, 12, 12, 13, 12, 12, 12, 12, 12, 12, 12, 12, 12, 12
1870	63, 121		1903		18,843,590		22,331,820	461,639,788

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

# Summary of Gold Statistics for Canada, 1919, 1920, and 1921 Table 50

	1919	1920	1921
Gold ores and concentrates shipped (a)	29 \$10,972,559 4 · 0 \$1,990,664 766,764	\$187,635 27 \$12,088,474 3.5 \$1,741,992	\$1,915,747 31 \$14,774,036 3,-2 \$1,595,804 926,329
Production by provinces:  Nova Scotia.  Quebec.  Ontario.  Manitoba  Alberta.  British Columbia.  Yukon.  Imports of gold.  Exports of gold.  Value.	850 1,470 505,739 724 24 167,252 90,705 \$477,412 \$5,037,123	690 955 564,995 781 124,808 72,778 \$882,008	439 635 708, 213 207 49 150, 792 65, 994 \$597, 497 \$2, 560, 524

<sup>(</sup>a) The greater portion of the gold ores are treated in the reduction plants, at the mines. Thus these figures of shipments represent only a small proportion of the output from the mines.

(b) Includes gold from gold milling ores, copper ores and lead-zinc ores.

Refined Metal.—There were two refineries producing fine gold in Canada, namely, the Royal Mint, Ottawa, Ont., and that of the Consolidated Mining and Smelting Company of Canada, Ltd., at Tadanac, near Trail, B.C. From all ores treated during 1921, the latter company produced 56,297 fine ounces of gold. This gold was recovered principally from the gold and copper ores, but also from silver-lead, and dry ores. Small quantities of imported ores were also treated by this company.

### Refined Gold Produced at Trail, B.C.\*

TABLE 51

Calendar Year	ear Gold Calendar Year Fine ez.		Gold Fine oz.
904905	4,336 8,602	1913	11,97
906	9,993	1914	11,088 17,81
908	10,397 15,346	1916 1917	23,608 49,66
909 910	18,241 13,298	1918 1919	61,21 47,28
911	15, 270 12, 118	1920	42,63 56,29

<sup>\*</sup>Includes some gold derived from imported ores and from occasional shipments from Ontario, Manitoba, Alberta, and the Yukon.

Receipts of Gold Bullion at the Royal Mint, Ottawa, Ont.

- ALL	ABI	-	E6	ä
J.	ABI	100	1)4	á

Calendar Year	From Cana	dian Sources	From Foreign Countries			
Calerdar Teni	Oz. Gross Gold Contents		Oz. Gross	Value Gold Contents		
		\$		\$		
908	219 - 19	3,823 03				
909	5,741-43		38 - 25			
010	65,009.35					
011	89,463-11		511-24	911-0		
912	104,825-29		742 - 79			
913	212,076-41		633 - 23			
14	29,762-24		4,750 - 19	98,062 8		
15	89,231-47			15,838,222 0		
116	49, 195-39	780,074 19	6,687,758-41	121,513,083 9		
017	55,779.96	840, 265 33	8, 196, 151 - 04	148,919,793 4		
018	302,785.96	4,982,743 81	3,728,224-05	67,739,887 6		
119	654,906-28	10,865,770 57	8,917.02			
20	724.083-34					
21	1.054.277.01		53.00			

In addition to the above, the Mines Branch of the Department of Mines operated the Vancouver Assay Office where crude bullion, nuggets and dust, were bought, melted, and sold. The receipts for the past fourteen years are tabulated as follows:—

## Receipts at Dominion Assay Office, Vancouver, B.C.

TABLE 53

Year	Weight before melting	Weight after melting	Net value	Year	Weight before melting	Weight after melting	Net value
1908 (a) 1909 1910 1911 1912 1913 (b)	48,478-58 46,064-31 39,784-70 59,068-82 111,479-94	ounces 89, 117-76 47, 576-27 45, 228-92 39, 069-31 57, 951-98 109, 920-49 163, 523-61	789, 267 94 746, 101 92 647, 416 38 974, 077 14 1, 448, 625 37		180, 292 · 83 191, 626 · 04 241, 762 · 77 209, 026 · 14 150, 869 · 17	175,393-10 187,884-48 238,245-07 205,947-57 147,718-25	\$ 2,736,302 31 2,828,239 65 3,257,220 71 4,099,505 80 3,547,524 93 2,409,174 41 2,834,499 61

<sup>(</sup>a) for 9 months only. (b) The removal of the assay charge in January 1913, accounts for the large increase.

## Imports of Gold into Canada, 1919, 1920 and 1921

Table 54

Item	1919	1920	1921
	8		5
Gold— Fringe Manufactures of Gold and Silver—	17,949	36,919	62,519
Leaf. Sweepings.	36, 105 5, 303 136, 612	108,788 6,605 184,681	47, 123 2, 771 97, 110
Manufactures, n.o.p Electroplated ware	281,443	545,015	387,974

#### NOVA SCOTIA

The gold production in Nova Scotia has been derived almost entirely from quartz ores and in 1921 it amounted to 439 fine ounces, valued at \$9,075, as against 690 fine ounces, valued at \$14,263, in 1920.

The 1921 production was the smallest recorded and the falling off during the past few years is attributed partly, as in other gold districts, to the high cost of supplies and labour, and partly to the exhaustion of the mines. Many small customs gold mills which were formerly operated in this province have been closed down. As mentioned in the description of the gold mining industry, only three companies carried on development work of any account.

## Production of Gold in Nova Scotia, 1862-1921

TABLE 55

Year	Tons treated	Fine ounces	Value	Yield of gold per ton	Year	Tons treated	Fine ounces	Value	Yield of gold per ton
			8	8				S	S
1862	6,473	6,863	141,871	21 91	1894	55,357	18,834	389.338	7 04
1863	17,000	13, 180	272,448	16 02	1895	60,600	21,919	453, 119	7 47
1864	21,431	18,883	390,349	18 21	1896	69, 169	23,876	493,568	7 13
1865	24, 421	24,011	496,357	20 32	1897	73, 192	27, 195	562.165	7 68
1866	32,157	23,776	491,491	15 28	1898	82,747	26,054	538,590	
1867	31,384	25,763	532,563	16 96	1899	112,226	29,876	617,604	5 50
1868	32,259	19,377	400,555	12 41	1900	87,390	28,955	598, 553	
1869	35,144	16,855		19 91	1901	91,948	26,459	546,963	5 32
1870	30,824	18,740		12 56	1902	93.042	30,348	627, 357	6 68
1871	30,787	18, 139		12 17 14 94	1903	103,856	25, 533	527,806	5 08
1872	17,089 17,708	12,352 11,180		13 05	1904	45, 436	10,362 13,707	214,209 283,358	4 71 4 90
1874	13,844	8,623		12 87	1906	57,774 66,059	12, 223	252,676	
1875	14.810	10,576	218,629	14 76	1907	58,550	13,675	282,686	
1876	15,490			15 08	1908	61,536	11,842	244,799	
1877	17,369		329, 205	18 95		56,790	10, 193	210,711	3 71
1878	17,989		245, 253	13 63	1910	43,006	7,928	163,891	3 81
1879	15,936	12,980	268, 328	16 83		18,328	7,781	160,854	8 78
1880	13,997	12,472	257,823	18 42			4,385		
1881	16,556	10, 147	209, 755	12 66	1913	14,360		90, 638	
					1910	7,324	2,174	44,935	
1882	21,081	13,307	275,090	13 04	1914	13, 156	2,904	60,031	
1883		14,571	301,207	11 60		25, 204	6,636	137, 180	
1884				12 44		17,497	4,562	94,305	
1885 1886	28,890 29,010			14 98 15 70	1917 1918	5,916	2,210	45,685	
1887				12 81	1919	1,630 1,362	1,176 850	24,310 17,571	14 91 12 90
1888	36, 178				1920	858	690		
1889						626	*418		13 80
1890						0.50	310	0,011	10 00
1891		21,841							
1892									
1893						2, 191, 212	000 720	18,806,057	8 58

<sup>\*439</sup> fine ounces reported as received by Royal Mint from Nova Scotia, 21 of which came from old ore dumps.

## QUEBEC

The gold production in Quebec during 1921 amounted to 635 fine ounces valued at \$13,127 as against 955 fine ounces valued at \$19,742 in 1920.

The production for this year was derived almost entirely from the zinclead ores of Notre Dame des Anges, Portneuf County. In other years the output was considerably augumented by the gold contained in the pyritic ores of the Eastern Townships which are worked chiefly for their sulphur contents. During the period the pyritic ore output fell off considerably. No alluvial production has been reported for a number of years.

Development and exploration continued to be carried on in Du Buisson township, Temiskaming District, and in the Hurricanaw, about 40 miles south

of Amos.

### Production of Gold in Quebec, 1877-1921

TABLE 56

Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value_
		8			\$			8
1877	583	12.057	1894	1,412	29, 196	1911	613	12,672
1878	868	17,937	1895	62	1,281	1912	(42)	13,270
1879	1,160	23, 972	1896	145	3.000	1913	701	14, 491
1880	1,605	33, 174	1897	44	900	1914	1,292	26,708
I881	2,741	56,661	1898	295	6.089	1915	1,009	22,720
1882	827	17.093	1899	238	4,916	1916	1,034	21,375
1883	860	17.787	1900			1917	1,511	31,235
1884	422	8,720	1901	145	3,000	1918	1,939	40,083
1885	103	2,120	1902	391	8,073	1919	1,470	30,388
1886	193	3,981	1900	180			950	19,742
1887	78	1,604	1904	140	2,900	1921	635	13, 127
1888	181	1,740	1905	191 165	3,940			
1889	65	1,350	1907	100	0.414			
1891		1.806						
1892		12,987	1909	193	3,990			
1893	759	15,696	1910	124	2,565		26,834	534.671

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

The principal operator in 1919 was the British Minerals Corporation, Limited, which carried on development on the Sullivan and Siscoe properties. No operations were reported in 1920 or 1921.

Reports on this area were published by the Quebec Bureau of Mines in the

Annual Report for the years 19121 and 19192.

### ONTARIO

The gold production of Ontario in 1921 amounted to 708,213 fine ounces, valued at \$14,640,062, as against 564,995 fine ounces, valued at \$11,679,483, in

1920, showing an increase of 25.3 per cent.

Since 1914 Ontario has become by far the largest producer of gold in Canada and this remarkable increase was brought about by the successful development of the Porcupine and Kirkland Lake districts and by the extension of milling facilities in these camps. The falling off in production during 1917 and 1918 was due to the abnormal conditions created by the war. The production increased during 1919 and 1920, and in the year 1921 was the greatest recorded. A favourable factor in gold production was the exchange premium; all gold sold to the Royal Mint was paid for in New York funds. In 1920 the United States dollar had an average exchange value in Canadian funds of \$1-1227 and \$1-1161 in 1921.

The principal producers during 1921 in order of importance were:—

Porcupine District.—Hollinger Consolidated Gold Mines, Ltd., Timmins. Dome Mines Co., Ltd., South Porcupine. McIntyre Porcupine Mines, Ltd., Schumacher. North Crown Porcupine Mines, Ltd., Timmins.

Kirkland Lake District.—Lake Shore Mines, Limited, Kirkland Lake. Wright-Hargraves Mines, Ltd., Kirkland Lake. Teck Hughes Gold Mines, Ltd., Kirkland Lake. Kirkland Lake Gold Mining Company, Kirkland Lake. Larder Lake District.—Argonaut Gold, Limited, Beaver House Lake.

Quebec Bureau of Mines Annual Report, 1912, pp. 217-229.
 Quebec Bureau of Mines Annual Report, 1919, pp. 125-158.

Considerable development work has been carried on during the last few years in many areas of Temiskaming, the most important being the extension of the Kirkland Lake Area towards the east; Goodfish Lake; Boston Creek; Bourkes, Matheson and Sesekinika stations, on the Temiskaming and Northern Ontario Railway; Matachewan, Lightning River, and Larder Lake areas. Reports on these areas have been published by the Ontario Bureau of Mines. 1

Much exploration and development has been done also in the new West

Shining Tree gold area, Sudbury district.<sup>2</sup>

In 1921 important development work was carried on in the Goudreau Lake area3 north of Sault Ste. Marie, Michipicoten district. Some work was also carried on in the area east of Wanipitie Lake.4

### Production of Gold in Ontario, 1887-1921

TABLE 57

Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value
		\$			8			8
1887		6,760	1900	14,391	297,495	1913		4,543,690
1888			1901	11,844	244.837	1914	268, 264	5,545,509
1889			1902	11, 118	229,828	1915	406,577	8,404,693
			1903	9,096	188,036	1916	492,481	10, 180, 485
1891		2,000	1904	1,935	40,000	1917	423, 261	8.749.581
1892	344	7,118	1905	4,402	91,000	1918	411.976	8,516,299
1893	708	14.637	1906	3,202	66, 193	1919		10,454,553
1894	1,917	39, 624	1907	3,212	66.398	1920		11,679,483
1895	3,015	62,320	1908	3,212	66,398	1921		14,640,062
1896	5,563	115,000	1909	1.569	32,425	Evala	100,810	12,010,000
1897	9, 157	189, 294	1910	3.089	63.849			
1898	12.863	265,889	1911	2.062				
					42,625	T . 4 . 1	4 011 017	07 050 000
1899	20,394	421,591	1912	86, 523	1,788,596	lotal	4,211,347	87,056,268

Calculated from the value: one dollar=0.048375 ounce

### MANITOBA

The gold production in Manitoba during 1920 amounted to 207 fine ounces, valued at \$4,279, as against 781 fine ounces, valued at \$16,145, in 1920; 724 ounces, valued at \$14,966, in 1919; 1,926 ounces, valued at \$39,814, in 1918; and 440 ounces, valued at \$9,095, in 1917. There was no production recorded prior to 1917.

Late in 1921 interesting finds were reported from the Elbow Lake district north of The Pas and many claims were staked. Operations were also carried on east of Lake Winnipeg in the Managotogan district. A report on the geology and mineral resources of the Rice Lake and Oiseau River areas of Manitoba was published by the Geological Survey during the year.

## SASKATCHEWAN

In the autumn of 1913 considerable interest was created in the reported gold discoveries at Beaver Lake (Amisk Lake). A number of prospectors went in with the opening of navigation. A good deal of prospecting was done during 1914, and some further work in 1915, but as yet no production has been reported.

<sup>(</sup>a) Boston Creek and Goodfish Lake Gold Areas. Bul, No. 29, Ontario Bureau of Mines, 1916.
(b) Matachewan Gold Area, Bul. No. 34, Ontario Bureau of Mines, 1918.
(c) Abitibi-Night Hawk Gold Area, Vol. XXVIII, Part II, 28th Annual Report, Ontario Eureau of Mines, 1919.

<sup>(</sup>d) Larder Lake Gold Area, Vol. XXVIII, Part II, 28th Annual Report, Ontario Bureau of Mines, 1919.

\*West Shining Tree Gold Area: Bul. No. 39, Ontario Bureau of Mines, 1920.

\*Goudreau Gold Area, Summary Report No. 21, Part D.

\*Wanapitic Lake Map Area, Summary Report, 21, Part D.

### ALBERTA

Small quantities of gold have been recovered every year from the gravels of the Saskatchewan River by individuals. These small lots are usually sold through the banks at Edmonton, which reported having received during the calendar year 1921 some 55 crude ounces containing 49 fine ounces of gold valued at \$1,013. This gold came from the Peace River area in the vicinity of the British Columbia-Alberta boundary. In 1919 some 24 ounces valued at \$500 was recovered and in 1920 no production was reported.

## Production of Gold in Alberta, 1887-1921

			ALC: U
Ų	1	.10	1.5

Year	Year Fine ounces ‡ Value		Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value	
		8			8			\$	
1887	102	2.100	1900	242	5,000	1913			
1888	58	1,200	1901	726	15,000	1914	48	992	
1889	967	20,000	1902	484	10,000	1915	195	4,026	
1890	193	4,000	1903	48	1,000	1916	82	1,695	
1891	266	5,500	1904	24	500	1917			
1892	508	10.506	1905	121	2,500	1918	27	558	
1893	466	9,640	1906	39	800	1919	24	500	
1894	726	15.000	1907	33	67.5				
1 (10) . W	2,419	50,000	1908	50		1921	49	1.013	
1890	2,661	55,000	LOZDA	25			***	2,000	
		50,000	44147	89					
1897	2,419			10					
1404	1,205	25,000	1911			m 41	15 1/Wi	919 999	
1200	726	15,000	1912.	73	1,509	Total	15, 109	312, 333	

Committed from the value one poller = 0.048375 ounce.

### BRITISH COLUMBIA

The gold production of British Columbia in 1921 amounted to 150,792 fine punces, valued at \$3,117,147, as against 124,808 fine ounces, valued at \$2,580,010, in 1920. This represented an increase of about 20 per cent. The production

from this province amounted to 16.27 per cent of the total for Canada.

The production in 1921 included (a) alluvial gold, 11.281 fine ounces or 7.5 per cent of the total for the province; (b) bullion from milling ores, 3,311 ounces or 2.2 per cent; (c) smelter recoveries, 52,643 ounces or 34.9 per cent and (d) the estimated recoveries from ores and concentrates exported, 83.557 ounces or 55.4 per cent. The corresponding quantities for 1920 were (a) 10,719 ounces or 8.8 per cent; (b) 16,672 ounces or 13.4 per cent; (c) 44,382 ounces or 35.6 per cent and (d) 53,035 ounces or 42.5 per cent. The amounts shown for alluvial gold are as published by the provincial Mineralogist while those for bullion from milling ores and smelter recoveries have been compiled from reports received from operators and smelters. The production in British Columbia is gradually increasing and although bullion from milling ores shows a heavy decrease due to the inactivity of the Nickel Plate Mine (Hedley Gold Mining Company) during the year, the production from exported ores has gained, largely through the developments at the Premier Mine. An aerial train at this property has facilitated the shipment of high grade ores and concentrates.

## Production of Gold in British Columbia, 1858-1921

TABLE 59

Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value	Year	Fine ounces ‡	Value
1858. 1859. 1860. 1861. 1862. 1863. 1864. 1865. 1866. 1866. 1869. 1870. 1871. 1872. 1873. 1874.	34,104 78,129 107,806 128,973 128,528 189,318 180,722 168,887 128,779 120,012 14,792 85,865 64,675 87,048 77,931 63,166	2,228,543,2,666,118,2,656,903,3,913,562,3,735,850,3,491,20,2,662,106,2,480,868,2,372,972,1,774,978,1,336,956,1,799,440,1,610,972,1,305,749,440	1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895	ounces ‡  49,044 50,636 46,154 38,422 35,612 34,527 43,714 33,558 29,834 28,489 23,918 20,792 19,327 18,360 25,664 61,289 86,504	\$, 827 1, 013, 827 1, 046, 737 954, 085 794, 252 736, 165 713, 738 903, 651 693, 709, 616, 731 588, 923 494, 436 429, 811 399, 525 379, 535 530, 530 1, 266, 954 1, 788, 206	1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917	288, 383 284, 108 275, 975, 285, 529 269, 886, 236, 216, 286, 858, 250, 320, 261, 386, 251, 815, 297, 459, 252, 730, 273, 376, 219, 633, 313, 742, 180, 163	4,930,145 5,205,485 6,149,027 5,224,393 5,651,184 4,540,216 2,764,693
1875	86,429 77,796 61,688	1,786,648	1898 1899		2,939,852 4,202,473 4,732,105	1921	167,252 124,808 150,792 8,594,300	3,457,406 2,580,010 3,117,147 177,660,141

Calculated from the value: one dollar = 0.048375 ounces.

The statistics reported by the Provincial Bureau of Mines covering 1921 production follow. The quantities given for lode gold production, which are based on the metal contents of ores shipped, are as a rule, somewhat higher than the record of smelter recoveries.

Production of Gold in British Columbia by Districts, 1920 and 1921\*
Table 60

		1	920		1921					
Districts	Gold 1	Placer	Gold	Lode	Gold I	'lacer	Gold Lode			
	Ounces	Value	Ounces	Value	Ounces	unces   Value		Value		
Cariboo:—		s		s		S		8		
Cariboo and Quesnel	3,300				3,370					
Omineea	150	3,000	218	4,506	150	3,000	13	269		
Cassian-	000	120 000			7,210	144,200	3	62		
Atlin, Liard and Stikine Skeena, etc	6, 930 150	3,000	54 531	1,127,156		2,000		1,760,713		
East Kootenay:-	100	0,000	01,001	1, 2001, 1411	100	2,000	00, 202	1,100,1110		
Fort Steele	175	3,500			180	3,600	1	20		
Windermere and Golden										
West Kootenay:-			32	661			11	227		
Ainsworth	25		1,924	39,769		1.000	3.587	74, 143		
Slocan and Slocan City			73			-,	19	393		
Trail Creek			36,425				44,980	929,737		
Revelstoke, etc	50	1,000	7	145	50	1,000	8	165		
Yale:-										
Grand Forks, Greenwood and Osoyoos	25	500	20,366	420.965	25	500	735	15.192		
Similkameen, Nicola and	20	000	20,000	120,000		000		10110		
Vernon	25	500	- 83	1,716	50	1,000				
Yale, Asheroft and Kam-		. 000	200	4 030	***	. 000				
loops	50	1,000	238	4,919	50	1,000				
Lillooet	175	3,500	120	2,480	400	8,000	374	7.730		
Southern Coast:—	-10	0,500	200			2,000				
Vancouver Island	25	500				500		2,150		
Mainland			6,012	124, 268	,		646	13,353		
Total	11 000	001 000	100 040	2,481,392	11 000	999 900	125 002	2,804,154		

<sup>&</sup>quot;From Annual Report of the Minister of Mines for British Columbia.

### YUKON

The gold production from the Yukon in 1921 was derived from the alluvial sands of Dawson and Whitchorse districts and showed a slight decrease from the record of the previous year. The figures for 1921 were 65,994 fine ounces. valued at \$1,364,217, which included 65,916 ounces from alluvial sands and 78 ounces from lead ores shipped to United States smelters, as against 72,778 fine ounces, valued at \$1,504,455, in 1920. Of the 1920 production 28 ounces was recovered in lode mining.

The number of crude ounces of gold on which bounty was paid was 82.394, and included 65,916 fine ounces gold valued at \$1,362,604, and 14,831 fine ounces of silver valued at \$9,292, or a total value of \$1,363,534. For 1920 the corresponding figures were 90.938 crude ounces, containing 72,750 fine ounces gold, valued at \$1,503,876, and 16,369 fine ounces silver valued at \$16,516, or a total

value of \$1.520,392.

The following table shows statistics of gold produced in the Yukon during the past 35 years. Between the years 1898 and 1906 the figures were based upon receipts of gold at the United States mints and receiving offices, credited to the Canadian Yukon.

## Production of Gold in Yukon, 1885-1921

TABLE 61

Year Fine Ounces ‡				Fine Ounces ‡			Fine Ounces ‡	Value	
1885) 1886, 1887 1888 1889 1890 1891 1892 1893 1894 1895 1895 1895 1897	3.386 1,935 8,466 8,466 1,935 4,233 8,514 6,047 12,094 14,513 120,937	40,000 175,000 175,000 40,000 87,500 176,000 125,000 250,000	1909 1910* 1911	1,077,553 870,750 701,437 592,594 507,938 381,001 270,900 152,381 174,150 191,565	3,150,000 3,600,000 3,960,000 4,570,362 4,634,574	1918 1919 1920 1921	282, S38 247, 940 230, 173 212, 700 177, 667 102, 474 90, 705 72, 778 65, 994	\$ 5,846,780 5,125,374 4,788,098 4,396,900 3,672,703 2,118,322 1,875,036 1,504,454 1,304,217	

Since 1906 a royalty of 2½ per cent has been collected by the Canadian Government which places a nominal value of \$15 per crude ounce recovered. The statistics shown for these years are based on the returns supplied by the Mining Lands and Yukon Branch of the Department of the Interior, in which the fine gold is estimated as 80 per cent of all crude gold, fine silver as 12 per cent, and the remaining 8 per cent regarded as worthless base metals.

The Vancouver Assay Office, which is operated by the Department of Mines, Ottawa, receives and melts a considerable portion of the placer gold from the During 1921 there was deposited from this territory 82.219-92 ounces, valued, after all charges had been deducted, at \$1,340,224.97, or \$16.30 per ounce,... as against 74,456.01 ounces, valued at \$1,206,579, or \$16.21 per ounce in 1920.

<sup>\*</sup>Calculated from the value: one dollar=0.048375 oz.
\*Including a small production from lode mines, from 1910 to 1919 isclusive.

#### DOMINION BUREAU OF STATISTICS

### eccipts from the Yukon, at the Dominion Government Assay Office, Vancouver, B.C., 1908-1921

TABLE 62

Year	Weight before Melting	Net Value	Average Value	Year	Weight before Melting	Net Value	Average Value
	Ounces	8	s		Ounces	8	
1908 (a) 1909 1910 1911 1912 1913 (b) 1914	60.132-00 5.003-12 3.594-87 2.073-61 2.211-88 15,235-29 56,564-83	1,000 · 296 83,871 62,094 34,994 36,481 247,189 915,914	16 · 63 16 · 75 17 · 27 16 · 88 16 · 41 16 · 22 16 · 21	1915	87,040-87 95,005-82 79,532-35 121,310-37 111,138-65 74,456-01 82,219-92	1,418,497 1,525,724 1,262,207 1,921,198 1,813,883 1,206,579 1,340,225	16-28 16-06 15-87 15-84 16-32 16-21 16-30

(a) For nine months only.(b) The removal in 1913 of the assay charge accounts for the great increase.

### Production of Crude Gold in the Yukon District

(Gross weight of dust, nuggets, and bullion in ounces)

TABLE 63

Month	1919	1920	1921	
January February March April May June July August September October November December	2, 609 · 39 491 · 22 742 · 75 1, 666 · 40 3, 978 · 07 18, 255 · 81 12, 084 · 24 19, 939 · 34 12, 201 · 85 36, 641 · 55 2, 040 · 88 2, 612 · 82 113, 264 · 32	280-78 18-00 9,497-14 140-52 44-42 10.505-24 11.018-56 12,865-26 8,575-41 32,243-87 3,992-30 1,756-72 90,938-02	813 - 77 622 - 22 22 - 87 36 - 18 14, 717 - 00 13, 585 - 40 14, 712 - 48 11, 773 - 78 22, 106 - 00 3, 183 - 10 791 - 75	

Between 1898 and March 31, 1922, a royalty to the extent of \$4,809,094.77 has been collected on the gold production of this district. The yearly amounts collected, as well as the annual production of gold as ascertained by the Department of the Interior, are shown below. The difference between these figures and those shown in the table of annual production, which are based on mint receipts of Yukon gold is probably due to three factors: (1) the fixing of the value of the gold for royalty purposes at \$15 per ounce, (2) the probability that, in the earlier years of royalty collection, considerable quantities of gold dust left the camps unrecorded and escaped royalty payments, and (3) the fact that in the last few years there has been a small production from lode mines.

# Gold Production in the Yukon and the Royalty Collected\*

TABLE 64

Fiscal Year	Total Gold Production	Total Exemption	Royalty Collected on	Royalty Paid
Ending June, 1898 Ending June, 1899 Ending June, 1900 Ending June, 1901 Ending June, 1902 Ending June, 1902 Ending June, 1903 Ending June, 1904 Ending June, 1905 Ending June, 1906 Ending March, 1906 Ending March, 1907 Ending March, 1909 Ending March, 1910 Ending March, 1911 Ending March, 1912 Ending March, 1912 Ending March, 1913 Ending March, 1914 Ending March, 1915 Ending March, 1915 Ending March, 1916 Ending March, 1917 Ending March, 1918 Ending March, 1918 Ending March, 1918 Ending March, 1919 Ending March, 1919 Ending March, 1919 Ending March, 1920 Ending March, 1921 Ending March, 1922  Total	4,649,634 4,458,278 3,960,207 3,266,019 1,947,082 1,660,450 1,246,486	1,699,657 2,501,744 1,927,666 1,199,114	5,882,626 7,307,7234,416 8,367,226 12,113,015 10,790,663 8,222,054 6,540,007 3,304,791 2,820,162 3,260,282 3,594,251 4,126,728 4,024,237 5,018,412 5,301,508 4,649,634 4,458,278 3,960,207 3,266,019 1,947,082 1,360,450 1,240,486 1,230,987	730,771 99 592,660 98 331,436 79 302,893 48 272,217 96 206,760 87 163,963 25 82,622 42 70,504 65 81,507 07 89,844 10 103,168 19 100,666 29 125,460 52 132,537 69 116,241 04 111,457 19 99,007 92

<sup>\*</sup>From the Report of the Mining Lands and Yukon Branch of the Department of the Interior, Fiscal Year ending March 31, by Controller H. H. Rowatt.

### IRON ORE

Not including the 6,800 tons of bog iron ore produced by one operator in Quebec and used in the gas industry, and a small shipment of the same kind of ore shipped from British Columbia, the total shipments or iron ore in Canada during 1921 amounted to 59,509 tons, the net value of which was \$230,164. This was the lowest production during any of the last twenty years.

The production included 58,399 tons of roasted siderite, worth \$226,675; 78 tons of briquettes, valued at \$360, and 22 tons of hematite, valued at \$99, all of which came from Ontario mines. British Columbia shipped some 1,010

tons of magnetite worth \$3,030.

The ore exported amounted to 1,058-5 tons valued at \$3,272 of which 1,010 tons came from British Columbia and 48-5 tons from Ontario. There was no iron ore mined in Nova Scotia during the period. The Nova Scotia Steel and Coal Company and the Dominion Iron and Steel Company imported hematite ore from Bell Island, Conception Bay, on the coast of Newfoundland. There was 422,763 short tons mined and raised, of which 384.529 tons was shipped. This ore had a percentage of iron varying from 50 to 52 per cent and was valued at \$894,948. Shipments were as follows:—

	Europe										\$462,249
10	Nova Scotia.	 	 	 		 		2.6	 	178.519	\$432,699
	Total	 	 	 	+ 1	 	1.1		 4.1	384,529	\$894,948

The European consignments were largely for Germany although considerable quantities went to Great Britain.

## Summary of Iron and Steel Statistics, 1918-1921

TABLE 65

TABLE 00					
		1918	1919	1920	1921
Iron ore shipped from mines. Canadian iron ore charged to blast furnaces. Imported " " Iron ore charged to steel furnaces. Pig-iron made in blast furnaces. " electric furnaces. " exported. " imported. Ferro-alloys made. " imported. " exported. Pig-iron and ferro-alloy consumption. " used in steel furnaces. Steel rails made. Considing only used in iron blast furnaces.	Short tons  ""  ""  ""  ""  ""  ""  ""  ""  ""	211,608 96,745 2,146,995 48,599 1,163,520 32,031 2,130,67,397 44,704 35,284 23,781 1,316,025 897,537 1,873,708 162,747 561,135	78, 391 1,674, 194 32, 409 910,080 7,701 63,605 35,800 48,601 4,384 22,449 932,349 609,670 1,030,342 316,304	149,515 1,957,738 64,146 1,081,561 8,835 102,628 57,483 28,173 7,908 25,422 1,181,228 732,486 1,232,697 255,322	59,509 126,653 1,141,007 36,308 664,993 683 2,685 18,636 24,594 2,295 10,031 708,278 465,750 747,582 298,110
Canadian coke used in iron blast furnaces. Imported " "  Number of completed blast furnaces. Number of men employed at blast furnaces. Wages paid at blast furnaces. Value of pig-iron produced. " iron aml steel goods exported. " iron and steel goods imported	No	561, 135 861, 522 20 1, 391 1, 941, 500 33, 495, 171 61, 772, 613 178, 340, 779	20 1,259 2,017,880 24,577,589 81,578,461	788,795	244,830 590,199 20 617 922,276 15,518,582 32,620,942 127,470,117

### PIG-IRON

The total production of pig-iron in Canada in 1921, excluding the production of ferro-alloys, was 665,676 tons, having a value of \$15,518,582, as compared with a total production in 1920 of 1,090,326 tons, valued at \$30,319,024, showing a decrease of 424,720 tons, or 39 per cent. Of the 1921 total, 664,993 tons was made in blast furnaces and 683 tons was made in electric furnaces from scrap metal, chiefly steel turnings. In 1920 the blast furnace production was 1,081,561 tons, and the electric furnace production from scrap steel was 8,835 tons.

The production of blast furnace pig-iron in Nova Scotia in 1921 was 169,504 tons, as against 332,493 tons in 1920. In Ontario the production of blast furnace pig-iron was 495,489 tons, as against 749,068 tons in 1920.

By grades the 1921 production included: Basic, 516,967 tons; foundry and malleable, etc., 148,026 tons; low phosphorus iron (electric furnace), 683 tons. By grades the 1920 production included: Basic, 740,598 tons; foundry and malleable, etc., 340,963 tons; low phosphorus iron (electric furnace), 8,835 tons.

The blast furnace plants operated included those of the Dominion Iron and Steel Company at Sydney, Nova Scotia; the Steel Company of Canada, at Hamilton, Ont.; the Canadian Furnace Company at Port Colborne, Ont.; the Algoma Steel Corporation, Limited, at Sault Ste. Marie, Ont., and the Midland Iron and Steel Co., at Midland, Ont.

Electric furnaces were operated for the production of pig iron and ferroalloys at Montreal, Quebec; at Orillia, Hamilton, Niagara Falls and Welland,

in Ontario.

The production of ferro-alloys in Canada in 1921 including ferro-silicon and spiegeleisen, was 24,594 tons valued at \$998,279. In 1920 the production was 28,173 tons valued at \$1,432,153.

The exports of pig-iron during 1921 were 2.685 tons, valued at \$70,686, or an average of \$26 per ton, and of ferro-alloys, 10.031 tons, valued at \$504,842,

or an average of \$249 per ton.

The exports of pig-iron included 2,461 tons to the United States and 224 tons to the United Kingdom. The ferro-alloy exports included 8,522 tons to the United States, and 1,509 tons to other countries. Exports to the United States of foreign products comprised a total of 61 tons, including 38 tons of pig-iron, valued at \$1,483, and 23 tons of ferro-alloys, valued at \$2,752.

The imports into Canada during 1921 included 18,636 tons of pig-iron, valued at \$501,418, or an average of \$26 per ton, and 2,295 tons of ferro-alloys, valued at \$298,818, or an average of \$130 per ton, making a total import of pig-iron and ferro-alloys of 20,931 tons, valued at \$800,236. The United States trade records showed exports to Canada during 1921 of pig-iron and ferro-alloys amounting to 18,224 tons, valued at \$476,214.

### STEEL

The total production of steel ingots and direct steel castings in 1921 was 747,582 tons, of which 722,484 tons were ingots and 25,098 tons direct steel castings.

The total production of steel in 1920 was 1,232,697 tons, of which 1,167,273

tons were ingots and 65,424 tons direct castings.

The 1921 production included: open-hearth steel, 726,777 tons; electric steel, 18.865 tons; erucible and converter steels, 1,940 tons.

The 1920 production included: open-hearth steel, 1,192,145 tons; electric

steel, 28,301 tons; crucible and converter steels, 12,251 tons.

The total production of electric furnace steel in 1919 was 15,502 tons; in 1918, 119,130 tons, and in 1917, 50,467 tons.

The total production of pig iron, ferro-alloys, and steel in electric furnaces was 33,821 tons in 1921, as compared with 59,812 tons in 1920, 41,683 tons in

1919, and 19,869 tons in 1918.

The exports of steel from Canada during 1921 included: billets, blooms and ingots, 4,671 tons, valued at \$294,184, or an average of \$63 per ton; bars and rods, 10,563 tons, valued at \$678,032, or an average of \$64 per ton; steel rails, 16,665 tons, valued at \$706,252, or an average of \$42 per ton; wire valued at \$395,392; wire nails, 33,888 tons, valued at \$441,720 or an average of \$13 per ton; structural steel 2,258 tons, valued at \$301,224, or an average of \$133 per ton; scrap iron and steel, 46,872 tons, valued at \$723,979, or an average of \$15 per ton, together with a large quantity of manufactured iron and steel goods. The re-exports of foreign produce consisted of bars and rods, 169 tons, valued at \$25,765; steel rails, 272 tons, valued at \$8,378; wire valued at \$35,399; wire nails, 23 cwt., valued at \$295; structural steel, 136 tons, valued at \$6,813; scrap-iron and steel, 31 tons, valued at \$705.

The production of rolled iron and steel products in 1921, including blooms, billets and slabs rolled for forging purposes and blooms, billets and slabs of hammered charcoal iron was 792,474 tons. The total production of rolled products included: steel rails, 298,110 tons; plates and sheets, 18,159 tons; wire rods, 81,778 tons; merchant bars and structural shapes, 72,774 tons.

The total production in 1920 of finished rolled products was 1.061,614 tons, which included: steel rails, 255,322 tons; plates and sheets, 39,283 tons; wire rods, 216,882 tons; merchant bars and structural shapes, 423,855 tons; rolled blooms and billets for forging purposes and rolled blooms, billets or slabs sold for export, 86,989 tons.

Detailed statistics of the iron and steel industry in Canada are given in a

special Bureau report entitled "Iron and Steel and their Products."

### LEAD

Production.—The production of lead in Canada in 1921 amounted to 66,679,592 pounds (33,339.8 tons), which at the average price of 5.742 cents per pound, was valued at \$3,828,742, as against 35,953,717 pounds (17,977 tons),

valued at \$3,214,262, or an average price of 8.940 cents for 1920.

The production in 1921 included: (a) 62,333,281 pounds (31,166.6 tons) of lead bullion produced at Trail, B.C., and pig-lead produced at Galetta, Ont.; (b) 4,343,611 pounds (2,171.8 tons), the estimated recoveries from lead ores exported to the United States; and (c) 2,700 pounds, the estimated recoveries from gold and silver ores of Ontario, also exported to the United States.

The corresponding figures for 1920 were: (a) 28,985,509 pounds (14,492.7

tons: (b) 6,958,637 pounds (3,479.3 tons); (c) 9.490 pounds (4.7 tons).

The statistics of lead production since 1912 as given in the accompanying table represent the quantity of lead produced in Canada from domestic ores, together with the estimated lead recovery from lead ore or bullion exported. Previous to 1913 the figures reported are those published by the British Columbia Provincial Mineralogist, which show the metal content of the shipments and are somewhat in excess of the actual amount recovered.

The production was mainly from British Columbia, with small amounts

from Ontario and Quebec.

The production of lead in British Columbia is derived from the zinc-lead ores of the East and West Kootenays. Detailed statistics covering the zinc-lead industry as a whole are given in Part Two of this report. During 1921 the smelter production from domestic ores amounted to 60,298,603 pounds valued at \$3,462,346, which included the lead contained in lead bullion recovered in the treatment of Canadian ores together with the estimated recoveries from lead ores exported. Compared with the record for the year 1920, in which the production amounted to 32,792,725 pounds valued at \$2,931,670, there was an increase of 83.3 per cent in quantity but only 18 per cent in value.

Previous to 1915 almost all the lead ores mined in British Columbia were smelted and refined at Trail, B.C. Since 1915 to the present date with the exception of 1917 considerable tonnages of lead ores and concentrates have been exported to the United States. In 1918 these exports amounted to over 27,000 tons of ores and concentrates, being mostly from the Sullivan mine at Kimberley, while in 1919 they were reported as being about 7,500 tons and in 1920 as being about 6,000 tons. During 1921 the exports of ore and concen-

trates dropped to 4,269 tons.

British Columbia is the main source of lead production in Canada.

### Production of Lead from Canadian Ores, 1887-1921

TABLE 66

Year	Pounds	Value	Cents per pound†	Year	Pounds	Value	Cents per Pound†
		\$				\$	
887	204,800	9,218	5 · 400	1905.	56,864,915	2,676,632	4.707
888	674,500	29,812	4 · 420	1906	54,608,217	3,089,187	5.657
889	165, 100	6,488	3.930	1907	47,738,703	2.542.086	5.325
890	105.000	4,704	4 - 480	1908	43, 195, 733	1,814,221	4 · 200
891	88,665	3,857	4.350	1909	45,857,424	1,692,139	3.690
892	808, 420	33,064	4.090	1910	32,987,508	1,216,249	3 - 687
893	2, 135, 023	79,636	3.730	1911	23,784,969	827.717	3.480
894	5,703,222	187,636	3 - 290	1912	35, 763, 476	1,597,554	4 - 467
895	16,461,794	531,716	3 - 230	1913	37,662,703	1,754,705	
896	24, 199, 977	721.159	2-980	1914	36, 337, 765	1,627,568	4 - 479
897	39.018.219	1,396,853	3.580	1915	46,316,450	2,593,721	5 - 600
898	31,915,319	1,206,399	3.780	1916	41, 497, 615	3,532,692	8 - 513
899	21,862,436	977,250	4 - 470	1917	32, 576, 281	3,628,020	
900	63, 169, 821	2,760,521	4-370	1918	51,398,002	4, 754, 315	9 - 250
901	51,900,958	2,249,387	4 - 334	1919	43,827,699	3.053.037	6 - 96
902	22,956,381	934.095	4 - 069	1920	35, 953, 717	3,214,262	8 - 946
903	18, 139, 283	768, 562	4 - 237	1921	66, 879, 592	3,828,742	5-749
904	37,531,244	1.617.221	4 - 309				

tln 1909 and 1910, average prices at Toronto as quoted by Hardware and Metal; in previous years, average prices at New York, as quoted by Engineering and Mining Journal.

From 1911 to date, average price in Montreal. Quotations furnished from 1911 to 1919, by Messrs. Thos. Robertson & Co., Montreal, Que.; 1920 and 1921 by Consolidated Mining and Smelting Company. Montreal, Que.

For a number of years there has been a very wide divergence between the record of lead recovery and the statements of lead contained in ores shipped from the mines. While the difference has been due, in part, to smelter losses, there was also, during 1912 and 1913 especially, a considerable accumulation of lead ores at the Trail smelter, and again in 1916 the estimated possible recovery (on the basis of a 90 per cent recovery) from lead ores shipped from the mines exceeded by far the actual smelter production.

The total mine shipments in 1921 of silver-lead ores and concentrates amounted to 15,259 tons, valued by the operators at \$671.313, and said to contain 9,517,616 pounds of lead, as against 69,493 tons, valued at \$2,985,848, containing 36,325.507 pounds of lead in 1920. While the shipments of silverlead ores and concentrates have greatly decreased, it may be pointed out that some 58,445,095 pounds of lead was contained in zinc-lead ores reported in the section on zinc as shipped from the Sullivan mine.

# Shipments of Lead Ores from Canadian Mines, showing Metal Contents

Year	Lead ores	shipped	Lead Contents	Silver Contents
	Tons	Value	Pounds	Ounces
912	59,814	\$ 2,544,942	45,896,537	2,366,29
913	85,978	3,276,812	53,807,570	2,564,13
915	70,207 73,752	2,652,802 2,958,394	50, 527, 130 48, 708, 005	2,501,8 2,954,1
916	84.516	4,568,500	54, 124, 628	2,582.9
91 ( · · · · · · · · · · · · · · · · · ·	46,799	3,866,862	38,696,116	1,670,0
318	75,256	4,705,573	46,843,602	2,314,5
918,,	54,508	3,044,839	32,147,989	2, 185, 3
120	69,493	2,985,848	36, 325, 507	2,882,1
921	15, 259	671,313	9,517,616	989,3

Previous to 1904 lead ores mined in Canada were either exported as ore or smelted in Canadian furnaces and exported in the form of base bullion for refining. A lead refinery employing the Betts electrolytic process has been in operation at Trail, B.C., since 1904, treating the base bullion produced by the lead blast furnaces.

The production of refined lead at Trail amounted in 1921 to 28,820 tons,

as against 13,237 tons in 1920 and 16,446 tons in 1919.

The North American Smelting Company erected a plant at Kingston, Ont., which operated towards the end of 1912, treating scrap and lead dross, as well as ores from the United States, British Columbia and Ontario. This plant closed down in 1913, but operations were resumed in 1916 by a company known as the Kingston Smelter Company, Limited, under lease. After operating about four months the plant was finally closed.

The Kingdon Mining, Smelting and Manufacturing Company, Limited, which is now smelting ores from the Kingdon mine at Galetta, Ont., came into existence early in 1919, when the plant was operated by the Estate of James

Robertson.

The production in Quebec, as in past years, was derived wholly from the deposits at Notre Dame des Anges.

## Refined Lead Produced in Canada\*, 1904-1921

Year	Pounds of Refined Lead Produced	Year	Pounds of Refined Lead Produced	Year	Pounds of Refined Lead Produced
1904 1905 1906 1907 1908 1909	15,804,509 20,471,314 26,607,461 36,549,274	1910 1911 1912 1913 1914 1915	23,525,050 35,893,190 37,923,043 36,443,706	1916 1917 1918 1919 1920 1921	32,115,114 31,571,112 34,330,920 28,720,030

<sup>&#</sup>x27;The refined lead reported includes the lead bullion produced from Canadian and foreign ores and refined at Trail, B.C., with also the gig lead from the Outario smollers.

# Exports of Lead from Canada, 1919, 1929 and 1921

	1919		1920		1921		
	Pounds	Value	Pounds	Value	Pounds	Value	
Lend in uce	13,142,900 11,326,800	\$ 616,278 772,734	7,549,400 18,800	\$ 385,839 1,846	6, 253, 700 23, 779, 700	\$ 256,834 992,485	
3 5491	24,469,700	1,389,012	7,568,200	387,685	30, 033, 400	1.249.31	

# Imports into Canada of Lead in Pigs, Bars, Sheets, etc., and Manufactures Table 70

		1919			1920			1921		
	Pounds	Value	Cents per Pound	Pounds	Value	Cents per Pound	Pounds	Value	Cents per Pound	
		8			\$			8		
Old and scrap, pig and							}			
	10,405,197	532,272	5.11	27,002,717		8-17	1,781.230	87,228		
Bars and sheets	573,994	35.097	6-11	768,726	67.872	8-83	236,696	15,411	6-5	
Litharge	3.046.300	126, 243	4 - 14	2,457,900	277,951	I1-30	1,650,500	131,000	7 - 9:	
Acetate and nitrate of										
lead	152,592	20,034	13 - 1	152.584	21,491	14-08	171.561	18,471	10.7	
Other manufactures		138,729			265.507			140,948		
Pipe lead	89, 493	8.013		48.769	5,185	10.63	72, 238	5,026	6.90	
Shots and bullets	7.083	976			10.497		14.152	1.081		
Tea lead	359,558	37,181			34,119		140, 259	12,586		
Lead pigments:-	000,000			4011410	0,,,,,,				1	
Dry white lead	158,582	13.186		34,520	3.003		16.027	1.533		
White lead, ground in	2001000	001400			01000					
oil	228,806	8 415		39,032	5 444		48, 424	5,123		
Dry red lead and		01110		00,000	0,		-0,10	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
orange mineral	1,120,713	102, 119		967, 533	110 989		795,275	85.486		
Orange millerat	8,100,110	102,119		8011000	8.0,000		700,210	277 200		
Total imports	1 519 101	123,720	8,15	1,041,085	120.136	11-54	859.726	75.142	8.74	
TOTAL LIMPOPUS	1,010,101	1917 ( 1917	0.10	T-041'000	120,100	11.04	000,160	10,120	0.1	

Prices.—The price of lead at Montreal, the main Canadian market, has been higher than the New York and London values for the past eight years. The average price of lead at Montreal in 1921 was 5.742 cents per pound as against 8.940 cents in 1920. The Toronto price in 1921 averaged 5.849 cents per pound, as against 9.041 cents in 1920, and the price in London per long ton was £22 6s. 7d. in 1921, as against £38 4s. 7d. in 1920.

## Yearly Average Prices of Lead in Montreal, London, New York, and St. Louis

(Value in cents per pound)

Table 71

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Montreal	4·467	4 · 659	4 - 146	5-600	8 · 513	11·137	9 · 250	6 · 966	8·940	5 · 742
London	3·921	4 · 072		4-979	6 · 715	6·626	6 · 539	6 · 216	8·219	4 · 951
New York	4·471	4 · 370		4-673	6 · 858	8·787	7 · 413	5 · 759	7·957	4 · 545
St. Louis	4·360	4 · 238		4-567	6 · 777	8·721	7 · 222	5 · 530	7·830	4 · 363

# Monthly Average Prices of Pig-Lead at Montreal\*

(Value in cents per pound)

TABLE 72

Month	1919	1920	1921
munry	6.75	9-90	6.09
ebruary	5.85	10.25	5-68
arch	6-12	11.07	5.37
pril,	5.65	9.85	5-40
ay	5.60	9.40	6 - 02
ne	6-10	9.30	5-71
dy	6.25	8.90	5.7
ugust	6.50	9-00	5.5
eptember	6.65	8-10	5 - 58
ctober,	6.75	7-60	5 - 58
ovember	7.80	7.30	5.83
ecember	8.35	5-80	6 - 2

<sup>\*</sup>Producers' prices for our load quantities ex-cars Montreal, as furnished by Messrs, Thos. Robertson & Co., Limited, Montreal, 1912 to 1919 and by Consolidated Mining and Smelting Company, 1920 and 1921.

## Monthly Average Prices of Lead in New York†

(Value in cents per pound)

			9
	ΒĪ		

Month	1919	1920	1921
January	5.432	8 - 561	4-82
February	5.057	8.814	4.37
March	5 · 226	9 - 145	4 - 08
April	4.982	8.902	4.35
May	5-018	8 - 576	4.95
June	5.340	8.323	4 - 48
	5.626	8-338	4.41
July	5.798	8 687	4 - 38
August	6.108	8 - 179	4 - 60
October	6 - 487	7.070	4.69
November	6.808	6 - 159	4 - 68
December	7 - 231	4 - 727	4.70
Average	5 - 759	7.957	4 - 54

tFrom the Engineering and Mining Journal.

## Monthly Average Prices of Lead in London‡

(In £ Sterling per ton of 2,240 pounds)

TABLE 74

Month		1919			1920			1921	
January. February March April May June July August September October November December	£ 34 26 26 24 23 22 23 25 25 28 34 41	8 10 13 16 8 18 12 14 1 12 15 16 7	d 0 0 11 7 6 2 2 7 7 11 1 8	£ 47 50 47 40 39 35 35 36 35 32 24	8 7 12 1 4 3 1 9 8 7 2 5	d 2 9 10 0 2 4 0 10 6 2 6 10	£ 23 20 18 20 23 22 23 22 23 24 24 24	8 13 8 20 17 0 7 6 6 19 12 4 16	d 33 9 11 6 0 2 5 6 0 2 2 9
Yearly average	28	3	11	38	4	7	22	6	7

<sup>\$\</sup>textsquare\$ As published by the Metal Information Bureau, London.

Bounties.—The Lead Bounty Act of 1913 expired in June, 1918, and was not re-enacted. The text of this Act and the regulations under which the Act was administered were quoted in the Annual Report on Mineral production for 1914 and previous years.

Statement of Bounties Paid on Lead during the Fiscal Years 1899 to 1921 Table 75

Year ending	Bounty paid	Year ending	Bounty paid	Year ending	Bounty paid
June 30, 1899	43,335 30,000 4,380 195,627	June 30, 1906	1, 995 51, 001 307, 433 340, 542 248, 534 179, 288	March 31, 1914 March 31, 1915 March 31, 1916 March 31, 1917 March 31, 1918 March 31, 1919 March 31, 1920 March 31, 1921	3, 217

## Production of Lead from Quebec Ores, 1915-1921

Table 76

Year	Pounds	Value	Year	Pounds	Value
1915	40,401 698,760 1,378,001	\$ 2,262 59,485 153,468		2,110,059 2,280,000 905,472 595,881	\$ 195,180 158,825 80,949 34,215

### Production of Lead from Ontario Ores, 1913-1921

Table 77

Year	Pounds	Value	Year	Pounds	Value
1913	33,000 88,985 685,932	\$ 1,537 4,983 58,393	1917. 1918. 1919. 1920. 1921.	1,586,711 1,684,366 1,487,586 2,255,520 3,312,493	\$ 176,712 155,804 103,625 201,643 190,203

# Production of Lead from British Columbia Ores, 1887-1921

TABLE 78

Year	Pounds	Value	Year	Pounds	Value
		8	*		8
1887	204,800	9,213	1905	56,580,703	2,663,254
1888	674,500	29,813	1906	52,408,217	2 964, 733
1889	165,100	6,488	1907	47,738,703	2 542,086
1890			1908	43, 195, 733	1,814,221
1891			1909	45,857,424	1 692, 139
1892		33,064	1910	32,987,508	1 216, 249
1893		79,490	1911.	23,784,969	827,717
1894		187,636	1912	35,763,476	1 597,554
1895		531,716	1913	37,626,899	1.753,037
1896		721, 159		36,289,845	1.625,422
1897		1,390,513		45, 377, 064	2,541,110
1898		1,198,017	1916	39, 157, 701	3 333,496
TONG		977, 250 2, 760, 031		29,483,725 47,594,328	3, 283, 602 4, 402, 473
1900		2,235,603	1918	40,060,113	2,790,587
1902		917,005		32,792,725	2,790,587
1903		766.443	1921	60, 298, 603	3.462.346
1904	00 0 0 011	1,579,086	1041	110, 200, 003	0,702,020

The record given in the preceding table represents the recovery of lead from domestic ores at the smelter or refinery as distinguished from the figures given in the table next succeeding, which indicate the quantities of lead contained in ore sent to smelters.

### Production of Lead in British Columbia by Districts\*

(Lead contained in ore shipped from mines, in pounds)

TABLE 79

District	1919	1920	1921
Cassiar— Atlin, etc. Skeena, etc East Kootenay— Fort Steele Windermere, etc West Kootenay— Ainsworth. Nelson Slocan Revelstoke, etc		26,926,319	
Yale— Yale—Kamloops Similkameen, etc Grand Forks, etc Cariboo— Onimeca	29, 485 4, 594 43, 200 180, 455 29, 475, 968	2,720	

<sup>\*</sup> From the Report of the Minister of Mines, B.C.

### MERCURY

There has been no production of mercury recorded since 1897. The small production reported in 1895, 1896, and 1897, was derived from the deposits at the western end of Kamloops Lake, B.C. These deposits consist of quartz veins containing pockets of cinnabar, in a zone of decomposed tertiary volcanic rocks.

Mercury has also been reported as occurring in ores of the Cobalt district, and in the neighbourhood of Field, B.C., and Sechart, on the west coast of

Vancouver Island.

The Kerr Lake Mines, Limited, of Cobalt, Ont., in its annual report to the shareholders, reported recoveries of mercury amounting to 545.5 pounds in

1918, and 137.5 pounds in 1919.

Large quantities of mercury have been used during the war in the manufacture of munitions, for detonators and explosives, and since the British Empire is entirely dependent on foreign sources for supplies of this metal, it was considered advisable to make an investigation of the deposits at Copper Creek, on the north side of Kamloops Lake, B.C., as a locality from which a supply might be obtained if other sources were cut off. An examination was made in July, 1918, by Mr. Chas. Camsell, of the Geological Survey Branch, Department of Mines, Ottawa. His report appeared in the Summary of the Geological Survey for 1918 (part B., pp. 17-22).

The imports of mercury during 1921 were 30,894 pounds, valued at \$20,570,

as against 209,020 pounds, valued at \$272,152, in 1920.

# Production of Mercury in Canada, 1895-1921

TABLE 80

Calendar Year	Flasks*	Price per flask	Value
1895 1896 1897 1898–1921	71 58 9	\$ 33.00 33.44 36.00	\$ 2,343 1,940 324

<sup>\*</sup>Seventy-six and one-half (7612) pounds each.

## Imports into Canada of Mercury, 1907-1921

TABLE 81

Calendar Year	Pounds	Value	Calendar Year	Pounds	Value
		\$			8
907	189,841		1915	184,432	159, 18
908	87,620 285,958	147 895	1916	79, 204 71, 608	74,46
910	107.888	63, 450		56, 936	68,90
911	118,336	67,416		26, 465	31.57
912	137, 474	72,171	1920	209,020	272, 15
	219,442		1921	30,894	20,57
1913	219,442 204,229	109,493 97,449	1921	30,894	

## **Average Monthly Price of Mercury**

(Per flask of 75 pounds)

TABLE 82

Month	1919		19	20	1921		
MORUI	New York	San Francisco	New York	San Francisco	New York	San Francisco	
	8	S	S	\$	S	-	
January	105 - 50	103 - 07	90, 192		48 - 440		
Cebruary	89-84	91.45			49 - 545		
farch	71.56	73-68			46.796		
pril	72.94	71 - 20			45 - 423		
lay	83 - 12	78.60			47-000		
une	93 - 25	89.83					
uly	104 - 68	98-85					
ugust	107.08	103.73					
eptember	102 - 52	99.83					
etuber	86-35	86 - 23			39-840		
lovember	90.74	82 - 28					
December	98 - 27	91 - 13	49.577		49-212		
Year	92-15	89-16	81 · 123		45 - 462		

#### MOLYBDENUM

There was no production of molybdenite in Canada during 1920 and 1921. The total production in 1919 representing the quantity of MoS<sub>2</sub> contents of the concentrates produced, for which payment was made, amounted to 83,002 pounds, valued at \$69,203, or an average of about 83.4 cents per pound. The total production in 1918 representing the MoS<sub>2</sub> contents of the concentrates produced for which payment was made, amounted to 378,029 pounds which at \$1.15 per pound would have a total value of \$434,733.

In 1919, the total shipments of concentrates as stated by the producers were 46.0 tons, valued at \$69,203, while 6,783 tons of ore was treated at the concentration plants. In 1918 the total shipments of ore and concentrates were 461.4 tons valued at \$428,807, and 33,935 tons of ore was treated at the concentrating plants.

## Production of Molybdenite in Canada, 1902-1921

TABLE 83

Calendar Year	Ores mined			Ores and concentrates shipped		MoS <sub>2</sub> pro (probable	
	Tons	Tons	Tons	Value (a)	Pounds	Pounds	Value (b)
1902	600		3·3 85·0			(e) (c)	(e) (e)
1914. 1915.	166 2,242	216		28,920	29,210	29,210	
1916. 1917. 1918.	13,522 26,871 34,030	22,605	1,554.3	320,006	330,316	288,705	288,705
1919. 1920-1921	7,280	6,783	46.0	69, 203	83,002	83,002	69,203

<sup>(</sup>a) Value as given by the operators.

The war stimulated the demand for molybdenum ores to a considerable extent, but with the cessation of hostilities, the producers were left with considerable stocks on hand which could not very readily be absorbed in peace times with the limited uses for the metal, apart from the making of ferro-molybdenum. The price declined accordingly to as low as 40 to 50 cents per pound for forced sales.

A few companies carried on development work during 1919 and 1920 but the only producer in 1919 was the Dominion Molybdenite Company, Limited, operating the property at Quyon, Que. for part of the year only.

The ore produced has been chiefly low grade material carrying less than 2 per cent MoS2 but included small quantities of orc running from 2 to 15 per

cent MoS, and some higher grade hand picked material.

All the ore produced in Canada has been concentrated in Canadian mills erected for the purpose, and marketed either as concentrates, molybdic acid, ammonium, molybdate, or as ferro-molybdenum for the manufacture of which two electric furnace plants were established and operated during 1916, 1917, and 1918.

There has been no production of ferro-molybdenum since February, 1918.

There are molybdenite deposits in Nova Scotia, Quebec, Ontario, Manitoba, and British Columbia. The principal production has come from the Quyon mine. in Pontiac county, Quebec.

During the last few years, reports have been published on several of the

Canadian molybdenite deposits.1

Prices.—The market quotations in January, 1921, for molybdenum ore, 85 per cent MoS2, were 45 to 50 cents per pound of contained sulphide and were purely nominal, practically no sales being reported.

(d) "Report on the Deposits of Ontario." By A. L. Parsons. Can. Min. Journal. June 1, 1917.

of the Gool, Survey, 1916.

<sup>(</sup>b) Estimated at the average market value of molybdenite.

 <sup>1(</sup>a) "Report on the Geology and Mineral Resources of Keekeep and Kewagama Lakes Region. Quebec."
 By J. A. Bancroft, Report of Bureau of Mines. Quebec, 1911.
 (b) "Report of the Molybdenite Deposits of the Moss mine, Quyon, Que." By Chas. Camsell, Summary

Report, Geol. Survey, 1916.
(c) "Report on the Amprior-Quyon district, Ontario and Quebec." By M. E. Wilson, Summary Report of the Geol. Survey, 1917, Part E.

<sup>(</sup>e) "Report on the Molybdenite Deposits at Falcon Lake, Eastern Manitoba." By J. S. Delury. Can. Mining Journal, December 1, 1917.

(f) "Report on the Index Molybdenite Mine, Lillooet, B.C." By Dr. C. W. Drysdale. Summary Report

### NICKEL

The production of nickel in 1921 was the lowest recorded since the year 1908, and amounted to only 19,293,060 pounds (9,646.5 tons), valued at \$6,752,571, as against 61,335,706 pounds (30,667.9 tons), valued at \$24,534,282,

in 1920, or a decrease of 68 per cent.

This production included: (a) the nickel in the matte produced from the treatment of the nickel-copper ores of the Sudbury district, part of which matte was exported for refining; (b) the metallic nickel and the estimated nickel contents of the nickel oxides and nickel salts produced in the silver smelters of southern Ontario.

## Production of Nickel in Canada, 1889-1921

TABLE 84

Calendar Year	Pounds of nickel	Cents per pound	Value	Calendar Year	Pounds of nickel	Cents per pound	Value
			8				\$
889	830, 477	60	498, 286	1906	21,490,955	42	8,948,83
890	1,435,742	65	933, 232	1907.	21,189,793	45	9,535,40
891	4,035,347	60	2,421,208	1908	19, 143, 111	43	8,231,53
892	2,413,717	58	1,399,956		26, 282, 991	36	9,461.87
893.	3,982,982	52	2.071,151	1910	37, 271, 033	30	11, 181, 31
894	4,907,430	381	1.870,958	1911	34,098,744	30	10, 239, 63
895	3,888,525	35	1,360,984	1912	44,841,542	30	13, 452, 46
896	3,397,113	35	1,188,990		49,676,772	30	14,903,0
897	3.997.647	35	1,399,176	1914	45, 517, 937	30	13,655,3
898	5,517,690	33	1,820,838	1915	68, 308, 657	30	20, 492, 5
899	5,744,000	36	2,067,840	1916	82,958,564	35	29,035,4
900	7,080,227	47	3,327,707		84,330,280	40	33,732,1
901	9, 189, 047	50	4.594,523	1918	92,507,293	40	37,002,9
902	10,693,410	47	5,025,903	1919	44,544,883	40	17,817,9
903	12,505,510	40	5,002,204		61,335,706	40	24,534,2
904	10,547,883	40	4,219,153	1921	19, 293, 060	35	6.752.5
905	18,876,315	40	7.550.526				

In 1921 a total of 257,154 tons of nickel-copper ore was mined and 393,768 tons was smelted from which there was produced 19,497 tons of Bessemer matte carrying approximately 9,628.4 tons of nickel and 6,322.6 tons of copper. The average metal recovery in the matte from the ores treated was 2.44 per cent nickel and 1.60 per cent copper.

In 1920 the nickel-copper ore mined amounted to 1,135,792 tons, and smelted 1,086,159 tons, from which was produced 57,938 tons of Bessemer matte carrying approximately 30,557 tons of nickel and 16,000 tons of copper. The average metal recovery in matte from the ores treated was 2.69 per cent nickel

and 1.41 per cent copper.

# Production of the Sudbury District

Table 85

	1917	1918	1919	1920	1921
Ore mined		1,559,892 87,184 23,482	754,567 42,736 12,099	16,000	

The nickel-copper ore is reduced in smelters and converters to a Bessemer matte containing from 77 to 81 per cent of combined metal; in 1921 it averaged

49.4 per cent nickel and 32.4 per cent copper. The percentages of metal since the year 1912 are shown in the following table:-

# Proportion of Nickel and Copper in Sudbury Matte

TABLE 86

V		Percentage		
Year	Nickel	Copper	Total	
912	53.5	26-3	79	
913	52.7	27.4	80	
314	49·0 50·3	31-1	80 79	
16	51.6	28.0	79	
17	50.6	26.9	77	
18	52.6	26.0	78	
19	51 · 6 52 · 7	28.3	79	
)20  21	49.4	27·6 32·4	81	

Monel metal is also produced directly from nickel-copper mattes, and contains about 22 per cent copper and \$8 per cent nickel. The ability to resist the corrosive action of acid and other solutions which readily attack steel has given this metal an importance in many lines of manufacturing. No production of monel metal was reported in 1921.

The past few years have witnessed great development in the nickel-copper industry, which has been the subject of many special reports by different depart-

ments and commissions (1)

Statistics covering the operations of mining, smelting and refining are shown

in a special chapter in this report.

The production from the refineries at Port Colborne, Ontario, and Deschenes, Quebec, and from the eastern Ontario smelters in 1921 was (a) metallic nickel, 5,430,147 pounds (2,715 tons), valued at \$1,825,359; (b) nickel oxides, 7,825,069 pounds, valued at \$1,585,896; and (c) nickel sulphate and nickel castings, 17,661 pounds, valued at \$6,100.

The corresponding figures for the year 1920 were (a) 10,962,792 pounds (5,481.4 tons), valued at \$3,836,782, (b) 4,889,571 pounds, valued at \$1,151,164.

and (c) 33,836 pounds, valued at \$10,116.

The new refinery erected at Port Colborne, Ont., by the International Nickel Company of Canada, Limited, started operations in July, 1918, and this company has the distinction of being the first to produce refined nickel in

Canada from the Sudbury ores.

The British America Nickel Corporation, Limited, completed in 1919 the construction of the smelter at Nickelton near Sudbury and the refinery at Deschenes. The smelter commenced operations early in 1920 and the refinery shortly afterwards. This latter plant produced refined nickel and copper and also recovered the precious metals platinum, palladium, iridium and gold from the treatment of residues.

The Port Colborne and Deschenes plants, and the smelters supplying them ceased operations about the middle of 1921 on account of poor markets for

nickel.

The total estimated nickel contents of the compounds recovered by the Ontario silver smelters in smelting silver-cobalt ores in 1921 was 36,160 pounds. as against 221,150 pounds in 1920 and 474,274 pounds in 1919.

<sup>&</sup>quot;Report on Nickel and Copper Deposits of Sudbury, Ont." By A. E. Barlow, Geol. Survey, Canada

No. 873, 1901.
"The Sudbury Nickel Region," By A. P. Coleman, Ph.D., Ontario Bureau of Mines, Vol. XIV, Part

III. 1904.
"The Nickel Industry with Special Reference to the Sudbury Region, Ontario." Report by A. P. Coleman, Ph.D., Mines Branch, Ottawa, No. 170, 1913.
"Report of the Royal Ontario Nickel Commission with Appendix, Toronto, 1917."

### Production from the Silver-Cobalt-Nickel Smelters of Eastern Ontario TABLE 87

Year	Metallic	Nickel	Nickel-Oxides		Nickel contents	
	Pounds	Value	Pouuds	Value	recoveries	
		8				
912			* 91,377	9,137	±	
913			*268,304	30, 122	i	
914			*392,512	34,883	İ	
015	55.325	22,130	†282,025	31,262	231,63	
916	79,360	31,538	+555,868	101,358	361,70	
917	265,896	108,334	†657,549	122,963	556,96	
018	243, 186	88,720	†962,309	215,277	736,00	
919	397,884	137,435	†340,389	32,862	474.27	
020	204,537	71.287	†24,112	6,312	221,13	
921	10,973	3, 442	12,396	3,830	36,16	

<sup>\*</sup>Does not include the mixed oxides of cobalt and nickel. See chapter on 'Cobalt' for values. †Nickel-sulphate included with nickel oxides. ‡Figures not available.

Prices.—The average price of electrolytic nickel in New York during 1921 according to quotations published by the Engineering and Mining Journal-Press was 44 cents per pound for ingots and 41 cents for shot. Quotations were merely nominal owing to the depressed state of the market.

### Exports from Canada of Nickel in Ore and Matte and as Metallic Nickel, 1912-1921

LABLE SS	
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Calendar Year	Pounds	Value	Cents per pound
		\$	
12	44,221,880	4,661,758	10-5
13	49,459,017	5, 195, 560	10.5
14	46,528,327	5, 149, 427	11.0
15	66,410,442	7,394,446	11-1
16	80,441,700	8,662,179	10.7
17	81,272,400	8,708,650	
18	87,478,500	11,263,246	
19,	41,016,400	8,077,593	19-6
20	60, 199, 300	11,988,857	19.5
91	12,859,100	3, 102, 944	24 - 1

# Imports into Canada of Nickel, 1912-1921

TABLE 89

Year	Nickel, nick German silv and blo	er, ingots	Nickel, nick German silv rods, strips and pla	ver, bars, s, sheets	Mfrs. of German, Nevada and nickel-silver not plated	Nickel- plated ware n.o.p.
	Pounds	Value	Pounds	Value	Value	Value
1912 1913 1914 1915 1916 1917 1918 1919 1919 1920	48, 245 42, 726 70, 564 74, 381 179, 367 303, 853 95, 306 76, 578 7, 197 770	\$ 17, 957 14, 705 25, 362 27, 361 66, 515 123, 976 39, 295 29, 962 3, 260 421	619, 523 559, 765 549, 288 635, 963 713, 072 549, 992 542, 958 323, 411 (a) 728, 466 330, 420	\$ 154,387 147,815 130,665 169,807 258,811 245,370 199,600 105,977 253,299 125,874	86, 672 83, 185 77, 538 89, 084 149, 718 204, 208 343, 063 570, 984	\$ 1,311,362 1,536,397 986,492 689,577 1,097,903 1,290,220 1,082,787 1,455,627 2,000,767 1,279,501

TABLE 91

In view of the large exports of nickel from Canada to the United States and its refinement in that country a record of the imports into, and the exports of nickel from the United States may be of special interest, and is shown below as compiled from the "Foreign Commerce of the United States."

United States: Imports and Exports of Nickel,\* 1920 and 1921
Table 90

		1920		1921			
	Quantity	Value	Cents per pound	Quantity	Value	Cents per pound	
		\$			\$		
Imports into United States:— Ore and matteGross tons. Nickel contentPounds	32,650 41,586,108	8,463,872	20.35	2,042,178	432,786	21 - 19	
Exports of nickel, nickel oxide and matte from United States to:-							
Belgium (a) Pounds. France " Italy "	594,976 72,912	279,365 36,895					
Netherlands	69,622	30, 501	43.81				
Japan " Other Countries "	352,834 124,888	164,781 63,303	46-70	103,484	45, 134		
	1,215,232	574,845	47.30	425,851	103,372	24 - 2'	

<sup>\*</sup>From the "Foreign Commerce of United States."

# Imports of Nickel Ore and Matte into the United States\*

From	1	919	1	920	1921	
I lom	Ore and Matte	Nickel content	Ore and Matte	Nickel content	Ore and Matte	Nickel content
Belgium			Tons 703			Pounds 174,89
France. Norway. Canada (a) Oceania—				37,737,459	1,407	1,867,27
French		3,716,293	1,080	1,595,267 1,396,001		
Peru. Chile New Zealand						
Totals	23,057	29, 303, 228	32,650	41,586,108	1,507	2,042,17

<sup>\*</sup> From Reports on the commerce and navigation of the United States, Department of Commerce, Washington, D.C.

(a) Values were: in 1919, \$4,997,650; in 1920, \$7,723,278; and in 1921, \$390,098.

# Exports of Nickel, Nickel-Oxide, and Matte from the United States\* (Nickel Content In Pounds)

Table 92

. To	1919	1920	1921
Belgium	442,680	594,976	
Denmark			
France	1,346,119	72,912	
Germany	202 040	5,600	
Italy	525, 940		
Netherlands	57.091		
Norway	10,056		
Portugal			
Russia in Europe			
Spain.	12,971		
Sweden	12,769	908	
Switzerland		89, 169	
United Kingdom-			
England	736, 033	69,622	7:
Scotland	11,404		
North America—	07 070	1 1 4 5 7	1 000
Canada	35,972	1,145	1,023
Cuba	794 80	110	†1112
Mexico	37	110	
Panama			
West Indies (Dutch).			
Haiti			
South America—	4 405	000	
Argentina	4,467	236	
Brazil	1,327	10,064	
Chile	134	1,219	
Colombia	500		
Venezuela			
Asia—	20.780	547	
China		9.21	
British India			
Dutch East Indies.			
Hopg Kong	2,740		******
Japan	582,946	352,834	103, 48
Russia in Asia			
Oceania-			
British Australia and Tasmania	281		1321, 157
New Zealand		15,890	
Philippine Islands	20		
Egypt			
Switzerland	4,149		
Nicaragua	166		
Dominican Republic	1,000		
Ecuador	200		
(Pata)	9 910 080	1 015 000	105 051
Total	3,810,656	1,215,232	425,85

<sup>\*</sup>From Reports on the commerce and maxigation of the United States, Department of Commerce Washington, D.C. †Costa Rica.

Bounty on Refined Nickel and Nickel-oxide.—Under the terms of "The Metal Refining Act, 1907," of the province of Ontario (7 Edward VII, chapter XIV), a bounty was authorized to be paid on nickel, cobalt, copper, and arsenic under certain conditions and restrictions during a period of five years following the passing of the Act (April, 1907). In March, 1912, the Act was amended to cover a further period of five years. The Act expired in April, 1917, and was not re-enacted.

<sup>#</sup>French Oceania.

### PLATINUM AND PALLADIUM

Platinum in Canada is found in the alluvial sands of British Columbia, principally in the Similkameen district, and it also occurs in the nickel-copper ores of the Sudbury district, associated with palladium, iridium, gold, silver, and other metals of the platinum group.

The recorded production in 1921 from the alluvial sands was 23 crude ounces, valued at \$1,585, as against 17 crude ounces, valued at \$719, in 1920 and 25 ounces, valued at \$2,150, in 1919.

Undoubtedly, the most important sources of the metals of the platinum group in Canada are the nickel-copper ores, but due to the fact that these precious metals occur in very small quantities per ton of ore and also to the fact that the processes necessitated are difficult to carry on, no attempt was made to recover these metals in Canada, previous to 1919.

The International Nickel Company of Canada reported a production at its Port Colborne refinery of precious metals cement containing 142.7 ounces of platinum, 309.6 ounces of palladium and 45.7 ounces of rhodium, osmium, etc., together with some gold and silver.

The British America Nickel Corporation in 1921 recovered in its refinery at Deschênes, Quebee, 125.84 fine ounces of platinum; 280.85 fine ounces of palladium; and 10.33 fine ounces of iridium. Small quantities of gold and silver were also recovered. This was the first production of these metals reported by this company.

For many years past there has been a more or less regular recovery at the New Jersey plant of the International Nickel Company of metals of the platinum group from the residues obtained in the refining of the Sudbury nickel-copper mattes; but as residues from other sources were treated with those from the Canadian ores, the total recovery could not be regarded as of Canadian origin; nevertheless, it is believed that the Sudbury mattes have been the source of by far the greater part of the platinum group metals recovered.

# Summary of Platinum Statistics, 1919, 1920 and 1921

- (2)	The second			0	-
- 1	- 1	EHT	Æ	-3.1	141

	1919	1920	1921
Platinum production from alluvial sands	25 \$2,150 23	17 \$719 15	23 \$1,585
Platinum recovered at the Ottawa Royal Mint	\$1,990	\$775	\$942
Platinum	\$1,447 62	\$5,665 174	\$21,014 590
Rhodium, etc	\$3,534	\$11,096 20 \$1,249	\$26,613 56 \$3,433
Imports of platinum as crucibles, wire, bars, etc		\$125,977 790 \$85,740	\$94,551 1,180 \$82,311

The Mond Nickel Company did not furnish figures as to the precious metal contents of its matte in 1921, but from assays made on behalf of the Royal Ontario Nickel Commission on samples obtained from that company some years ago, it would appear that the matte produced by the Mond Nickel Company is considerably richer in metals of the platinum group than that from the Cana-

dian Copper Company.

There was also a small production of platinum and associated metals from the residues obtained in the refinery of the Royal Mint, Ottawa. The recovery at the Royal Mint, Ottawa, in 1921 was 18.843 ounces of crude platinum, valued at \$942.15. In 1920 the recovery was platinum, 14.6 ounces, valued at \$775.07. The recovery in 1919 was: platinum, 23.3 ounces, valued at \$1,990.12; and iridium, 20.8 ounces, valued at \$2,268.12. The above figure 18.843 was not included in the record of production for Canada, owing to the fact that the platinum recovered at the Royal Mint was derived only in part from the treatment of Canadian gold bullion while the iridium was obtained from the imported South African gold bullion. Some was also recovered in the melting of old jewellery and scrap.

Production of Platinum in Canada from Alluvial Sands, 1887-1921
Table 94

Year	Value	Year	Value	Year	Crude Ounces	Value
	\$		\$			8
1887	5,600	1897		1907-1912		
[888	6,000	1898	1.500		18	48
889	3,500	1899	825			
890,	4,500	1900		1915	23	1,00
891	10,000	1901	. 457	1916	15	60
892	3,500		190	1917	57	3,82
893	1,800	1903		1918	39	2,56
894	950	1904	420		25	2.15
895	3,800		500	1920	17	71
896	750	1906			23	1.58

Of Gelek property at the International Nickel Company's Works—New Jersey,

U.S.A.

Table 95	F.	Γ	A	B	l,	E	9	5
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Year	Matte treated	Gold	Silver	Platinum	Palladium	Rhodium	Others
1907	Tons 17·840 18·839 18·407 24·309 26·840 27·853 38·733 40·267 31·428 56·405 59·209	Ounces 993-572 5,238-1811 2,113-669 2,649-799 2,203-052 2,476-558 2,336-405 2,695-957 3,444-785 3,495-123 1,954-934	139,329+29 63,138+66 60,256+83 70,954+38 62,169+66 77,924+03 75,928+18 101,793+17	172 · 316 546 · 627 258 · 325 655 · 552 496 · 850 192 · 863		(a) (a) (a) (a) (a) (a) 191.067: 515.801 57.475 257.070	
1917. 1918. 1919. 1920.	62 · 250 19 · 528 30 · 740 2 · 217 · 000	1,968·703 634·043 613·338 6·901		649 · 737 616 · 716 488 · 901	786 - 654	472 · 579 227 · 294 390 · 336	

(a) Figures not given separately.(b) Includes Osmium, Iridium and Ruthenium.

### Recovery of Platinum Black, Iridium Precipitate, and Palladium at the Royal Mint, Ottawa, for the calendar years 1919, 1920 and 1921 TABLE 96

Calendar Years	Platin	шп	Irid	ium	Palladi	um
	Ozs. gross	Value	Ozs. gross	Value	Ozs. gross	Value
1919	29 · 281 7 · 220 18 · 843	\$ 400.56			0.696	

### Imports into Canada and Exports of Platinum, 1919, 1920, and 1921 TABLE 97

Te	1919		1920		1921		
Item	Ounces	Value	Ounces	Value	Ounces	Value	
Experts— Ores and concentrates Old and scrap	325 346	\$ 28,815 33,814	473 317	\$ 53,956 31,784	876 304	\$ 63,380 18,931	
Total exports	671	62,629	790	85,740	1,180	82,311	
Imports— Crucibles Wire and bars, strips,		15,642		13,772		6,198	
sheets or plates		144, 989		105,718		84,011	
Retorts, pans, condensers, etc		254		6,487		4,342	
Total imports		160,885		125,977		94,551	

## Average Yearly Prices of Platinum\*

TABLE 98

(In dollars per fine ounce.)

Month	1919	1920	1921
	\$	- 8	\$
January	104 - 85	154 - 23	73 - 400
February	100 - 43	151 - 59	70.227
March.	99 - 20	138-56	72-463
April	99.85	127 - 04	73 - 404
May	102-60	97 - 50	73 - 740
	105-80	85-19	74 - 942
June	105-90	83 - 94	70.440
July	107-60	111-44	73 - 222
August			
September.	128.70	115 - 20	75 - 960
October	132-21	101-70	81-800
November	136 - 74	84.75	82 - 609
December	151 - 35	79 - 62	78 - 192
Yearly average	114-61	110-90	75.033

<sup>\*</sup>From the "Engineering and Mining Journal."

Prior to the war the world's supply of platinum was derived almost entirely from the Ural mountains, Russia, but when hostilities commenced in the fall of 1914 the Russian production was reduced almost one-third. The subsequent internal troubles further crippled the platinum industry in that country and only a relatively small production has been made during the last few years.

In view of the serious shortage in the world's supply of platinum, and more especially because of its importance as a war metal, the Imperial Munitions Board, in June, 1918, requested the Canadian Munition Resources Commission to undertake an examination of certain platinum occurrences in Alberta and British Columbia, which was done by G. C. Mackenzie, of the Mines Branch, and secretary to the commission. Dr. W. L. Uglow, of the Commission staff, and Chas. Camsell of the Geological Survey Branch, collaborated with Mr. Mackenzie in this investigation, a detailed report of which was published in the spring of 1920.

### SILVER

The production of silver in Canada in 1921 amounted to 13,543,198 fine ounces, which at the average price for the year of 62.654 cents, was valued at \$8.485,355, as against 13,330,357 fine ounces at an average price of 100.90 cents, totalling \$13,450,330 in 1920, or an increase of 1.6 per cent in quantity and a decrease of 36.9 per cent in value.

The production in 1921 included: (a) refined silver and silver contained in silver and gold bullion, 9,080,718 fine ounces, or 67.0 per cent; (b) silver contained in blister copper and lead bullion, 1,649,057 ounces, or 12.2 per cent; and (c) silver estimated as recoverable from ores, etc., exported, 2.813,423 ounces, or 21.0 per cent. The corresponding figures in 1920 were (a) 9,201,094, or 69.1 per cent; (b) 2,373,650 ounces, or 17.8 per cent; and (c) 1,755,613 ounces or 13.1 per cent.

Although no official statistics of the production of silver had been published prior to 1887, the annual reports of the operating companies showed that from 1869 to 1885 about four million ounces of silver with a probable value of \$4,800,000 was produced. The producing mines were situated in the Port Arthur district in Ontario. From 1887 to 1893 the production ranged in value between \$300,000 and \$400,000 and was derived chiefly from Ontario and Quebec. The

<sup>&</sup>lt;sup>1</sup> Final Report of the Canadian Munition Resources Commission, from November, 1915, to March, 1919, inclusive.

next three years saw a rapid increase in production due to the development of the silver-lead deposits of British Columbia, and in 1896 a production of over \$2,000,000 was recorded. From that year until 1905 the production varied between \$2,000,000 and \$3,500,000 rising rapidly during the next six years to \$17,580,455 in 1910, as a result of the discovery of the rich ores of the Cobalt district. Since then there has been a falling off in quantity, but owing to the higher price of the metal, the value of the annual production increased to a maximum of \$20,693,704 in 1918. It will be noticed in the table of production that the output for 1919 though only 50 per cent of that of 1910 or 1911, when the production was at its maximum was more than equal in value.

## Production of Silver in Canada, 1887-1921

	LE	

Year	Ounces	Value	Cents per ounce	Yeur	Ounces	Value	Cents per ounce
1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901	355, 083 437, 232 383, 318 400, 687 414, 523 310, 651 847, 697 1, 578, 275 3, 205, 343 5, 558, 446 4, 452, 333 3, 411, 644 4, 468, 225 5, 539, 192 4, 291, 317	\$ 347, 271 410, 998 358, 785 419, 118 409, 549 272, 130 330, 128 534, 049 1,030, 299 2, 149, 503 3, 323, 395 2, 593, 929 2, 740, 362 3, 265, 354 2, 238, 351	98-00 94-00 93-60 104-60 98-00 77-00 63-00 65-28 67-06 59-79 58-26 59-58	1907 1908 1909 1910 1911 1911 1912 1913 1914 1915 1916 1917 1918 1919	8, 473, 379 12, 779, 790 22, 106, 233 27, 529, 473 32, 869, 264 31, 955, 560 31, 845, 803 28, 449, 821 26, 625, 960 25, 459, 741 22, 221, 274 21, 383, 979 16, 020, 657 13, 330, 357 13, 543, 198	8,348,659 11,686,239 14,178,504 17,580,455 17,355,275 19,040,924 15,593,631 13,228,842 16,717,121 18,001,895	66-79 65-33 52-86 51-50 53-49 53-30 60-83 59-79 54-81 49-68 65-66 81-417 96-772 111-122 100-900 62-654
1903. 1904. 1905.	3, 198, 581 3, 577, 526 6, 000, 023	1,709,642 2,047,095 3,621,133	53·45 57·22 60·35				64.773

Ontario has been the main producer of silver in Canada for the last ten years, its contribution increasing from 41 per cent of the total for Canada in 1905 to a maximum of 94 per cent in 1911. By 1914, it had fallen to 88.4 per cent and has been gradually decreasing each year, reaching 80.4 per cent in 1918; 75.5 per cent in 1919; 74.3 per cent in 1920, and 71.9 per cent in 1921.

The production of British Columbia which has fluctuated between two and five million ounces for the last twenty-five years was from 1914 to 1917 between 11 and 13 per cent of the total Canadian production. In 1918, it amounted to 18 3 per cent; in 1919, to 23 1 per cent; in 1920, to 25 0 per cent and in 1921, to 24 8 per cent, of the total.

The balance of the production, 3.3 per cent in 1921 as against 0.7 per cent in 1920 and 2.2 per cent in 1919, was derived from Quebec, Manitoba and the Yukon Territory.

Production of Silver in Canada by Provinces, 1887-1921\*

Ontar		ario	Quebec		British Columbia		Yukon Territory	
Year	Ounces	Value	Ounces	Value	Ounces	Value	Ounces	Value
		\$		\$		S		\$
87	190,495	181,630	146,898	143,666	17,690	17,301		
88	208,064	195,584	149,388	140,425	79,780	74,993		
89	181,009	169,980	148,517	139,012	53, 192	49,787		
90	158,715	166,066	171,545	179,436	70,427	73,666		
91	225, 633	222,926	185,584	183,357	3,306	3,266		
92	41,581	36,425	191,910	168, 113	77,160			
93		8,689		126, 439		195,000		
94			101,318	63,830	746,379	470,219		
95			81,753	53,369		976,930		
96			70,000	46,942	3,135,343			
97	5,000	2,990	80,475	48, 116		3,272,289		
98	85,000	49,521	74,932	43,655	4,292,401	2,500,753		
99	202,000	120,352	40,231	23,970				
00	161,650	99, 140	58,400	35,817	3,958,175		290,000	177,
01	151,400	89,250	41,459	24,440	5, 151, 333	3,036,711	195,000	114,
02	145,000	75,632	42,500	22, 168	3,917,917	2,043,586	185,900	96,
03	17,777	9,502	28,600	15,287	2,996,204	1,601,471	156,000	83.
04	206,875	118,376	15,000	8,583	3, 222, 481	1,843,935	133, 170	76.
05	2,451,356	1,479,442	19,620	11,841	3,439,417	2,075,757	89,630	54.
06	5,401,766	3,607,894	17,686	11,813	2,990,262	1,997,226	63,665	42.
07	9,982,363	6,521,178	16,000	10,452	2,745,448	1,793,519	35,988	23,
08	19,398,545	10, 254, 847	13, 299	7.030		1,391,058	63,000	
09	24,822,099	12.784,126	13, 233	6.815		1.364,387	45,000	
10	30, 366, 366	16,241,755	7,593	4,061	2,407,887	1,287,883	87,418	46.
11	30,540,754	16, 279, 443	18,435	9,827	1,887,147	1,005,924	112,708	60.
12	29, 214, 025	17,772,352	9,465	5.758	2,651,002	1,612,737	81.068	49.
13	28,411,261	16,987,377	34,573	20,672	3,312,343	1,980.483	87,626	52.
14	25, 139, 214	13,779,055	57,737	31,646		1,731,971	92,973	50,
15	22,748,609	11, 302, 419	63,450	31,524	3.565,852		248,049	123,
16	21,608,158	14, 188, 133	98,610	64,748	3,392,872	2,227,794	360, 101	236.
17	19,301,835	15,714,975	136, 194	110,885				
18	17, 198, 737	16,643,562	178, 675	172,907	3,921,336		71,915	
19	12,117,878	13, 465, 628	140, 926	156,600		4, 126, 556	27,556	30.
20	9,907,626	9,996,795		61,552	3, 327, 028	3,356,971	19,190	
21	9,761,607	6, 116, 037	38,084	23,861	3,350,357	2,099,133		
Grand Total	320, 352, 998	204, 685, 707	2,553,093	9 908 617	89, 431, 603	58 980 159	3, 188, 654	1,945.4

<sup>\*</sup>Does not include small productions from New Brunswick, Alberta, and Manitoba, in 1917, and from Manitoba in 1918, and 1919.

Important quantities of silver are being produced in Canada, both as fine metal and as bullion. Fine silver is produced at Trail, B.C., by the Consolidated Mining and Smelting Company of Canada, Limited, chiefly from the silver-lead ores, and in recent years from the copper-gold-silver ores of the province, and finds a market in Canada, the United States and China.

In Ontario, ores from the Cobalt district are treated by the Coniagas Reduction Company, Thorold, Ont.; the Deloro Smelting and Refining Company, Deloro, Ont.; the Ontario Smelters and Refiners, Ltd., with plants at Welland Chippewa, Ont. Silver bullion varying in fineness from 850 to 998.2 is produced at these works, other products being white arsenic, metallic nickel and cobalt, nickel and cobalt oxides and salts of nickel and cobalt.

Since 1918 there has been a small production of refined silver at the new refinery of the International Nickel Company of Canada at Port Colborne, Ontario, and since 1920 at Deschênes, Quebec, in the refinery of the British America Nickel Corporation.

The silver bullion from Ontario as a rule finds a market in the United States and England, but important quantities are also shipped to the Orient.

Exports from Canada and Imports of Silver, 1919, 1920 and 1921 Table 101

	1919	1920	1921
71	8	8	\$
Exports—	10 410 707	10 000 000	
In ore, concentrates, b llion	16,410,797	12, 238, 209	7,202,663
Bullion in bars and blocks. Coins.	3,458,097	2,453,450	581,861 2,083
Sterling	131,766	314,869	174,788
Leaf	36, 105	108,788	47, 123
Sweepings	5,303	6,605	2,771
Manufactures, n.o.p.  Electroplated ware	136,612 281,443	184,681 545,015	97,110 387,974

Prices.—The average price of silver in New York as quoted by the Engincering and Mining Journal-Press for the year 1921 was 62.654 cents, as against 100.9 cents in 1920.

On April 23, 1918, there was approved an Act of the United States Congress entitled, "An Act to conserve the gold supply of the United States, to permit the settlement in silver of trade balances adverse to the United States, and for the above purpose to stabilize the price and encourage the production of silver. On May 6, 1919, the United States Treasury Board lifted the restrictions on exports and removed the maximum price of \$1.01\frac{1}{2}\$ per ounce. The price of silver then started to rise and reached the high mark of \$1.37\frac{1}{2}\$ in November, the year 1919 closed with silver at \$1.31 per ounce.

By the end of January, 1920, the price of silver reached \$1.35 per ounce, then it started to decline gradually to about \$1 towards the middle of May, finishing the year at the low figure of 63 cents per ounce.

Purchase of domestic silver in the United States under the Pittman Act began in May, 1920, at the rate of \$1 per ounce 1,000 fine.

The causes of the sudden rise and fall in silver prices, as stated by the Engineering and Mining Journal are given as follows:—

### As to the rise:-

(1) Heavy demand for Indian currency since 1914.

- (2) Enormous bullion purchases by the English Government on Indian account.
- (3) Large excess of merchandise exports from Bombay, Calcutta, and other Eastern ports.
- (4) Huge military expenditures in India, Egypt, Mesopotamia and Palestine.
- (5) Embargo on silver imports on private account.

### As to the fall:-

- (1) Cessation of bullion purchases on government account in 1919.
- (2) Unfavourable balance of trade against India for the last six months, as shown by the large amount of Reserve Council Bills sold.
- (3) Unfavourable monsoon, or lack of rain during last summer and autumn.
- (4) The substitution of paper money in place of the silver rupee.

Yearly Average Prices of Silver in New York and London, 1908-1921
Table 102

Year	New York Cents per fine ounce	London Pence per Standard ounce (a)	Year	New York Cents per fine ounce	London Pence per Standard ounce (a)
1908 1909 1910 1911 1912 1913 1914	52 -864 51 - 503 53 - 486 53 - 304 60 - 835 59 - 791 54 - 811	23 · 726 24 · 670 24 · 592 28 · 042 27 · 576	1915. 1916. 1917. 1918. 1919. 1920. 1921.	49 · 684 65 · 661 81 · 417 96 · 772 111 · 122 100 · 900 62 · 654	23 · 675 31 · 215 40 · 851 47 · 516 57 · 059 61 · 590 36 · 841

(a) 925 parts fine.

Average Monthly Prices of Silver, 1919, 1920 and 1921
Table 103

• Months	New Yor	London Pence per Standard ounce (a)		
	1919	1920	1921	1921
January February March April May June July August September October November December	101 · 125 101 · 125 101 · 125 101 · 125 107 · 135 110 · 430 106 · 394 111 · 370 114 · 540 119 · 192 127 · 924 131 · 976	132 - 827 151 - 295 125 - 551 119 - 779 102 - 585 90 - 957 91 - 921 96 - 168 93 - 675 83 - 480 77 - 734 64 - 774	65-950 59-233 56-023 59-337 59-810 58-510 60-260 61-597 66-160 70-970 68-234 65-760	39 985 34 745 32 479 34 250 34 167 37 481 38 096 40 082 41 442 38 750 35 645
Average for the year	111-122	100-900	62 - 654	36-841

(a) 925 parts fine. From "Engineering and Mining Journal-Press."

### QUEBEC

The small quantity of silver credited to Quebec province for a number of years represents the silver recovery from the pyritic ores mined at Eustis and Weedon in the Eastern Townships, and the lead-zinc ores of Notre-Dame-des-Anges. Portneuf County. During 1921, the production was 38,084 fine ounces valued at \$23,861, as against 61,003 fine ounces valued at \$61,552 in 1920.

#### ONTARIO

The production of silver in Ontario in 1921 was 9,761,607 fine ounces valued at \$6,116,037, as against 9,907,626 fine ounces, valued at \$9,996,795 in 1920, a decrease of about 1.5 per cent in quantity and 39.1 per cent in value. In 1911 the total for Ontario amounted to some 30,540,754 fine ounces, but during the following years the production gradually decreased.

The silver ores of the Cobalt and adjoining districts, which in the early days of development were all exported for treatment, are now being reduced to an increasing extent each year within the camp by a combination of amal-

gamation, flotation and cyanide processes with the recovery of silver bullion. More complete statistics have been compiled in a special chapter on the silver-cobalt mining industry, covering the mines in active operation during 1921.

During 1921 a total of 5,060,454 ounces or 51.8 per cent of the total Canadian output was produced and sold as bullion in the Cobalt district; 3,884,683 ounces or 39.8 per cent was recovered and sold by the silver smelters of South Ontario; and 120,336 ounces or 1.3 per cent was contained in gold bullion, so that 92.9 per cent of the total production was obtained in the form of bullion within the province, leaving a balance of 683,586 ounces or 7.1 per cent recovered from Canadian minerals and mattes treated in the United States. The corresponding figures for 1920 were; as bullion in Cobalt district, 5,711,494 ounces or 58.6 per cent; in the South Ontario smelters, 3,334,724 ounces or 33.7 per cent; contained in gold bullion, 99,311 ounces or 1.0 per cent; total as bullion within the province, 92 per cent; and balance treated in United States 762,097 ounces or 7.7 per cent.

The following table shows the percentage of production from the camp, the

South Ontario smelters, and from ores exported to the United States:-

### Percentage of Silver Production Credited to each Group Treating Ontario Ores, 1914-1921

	1	216	1	3.3	1		<i>a</i> c.
- 1	- 30		и,	12 7	2	w	-25

Pendugian Group	1914	1915	1916	1917	1918	1919	1920	1921
Cobait district Ontario smelters.	6; 41.0 36.0	41·0 43·0	39·5 44·7	51-1 33-9	55·0 29·0	% 48-7 36-4	58·6 33·7	% 51-8 41-1
Total for Ontario	77 · 0 23 · 0	84·0 16·0	84 · 2 15 · 8	85·0 15·0	84·0 16·0	85·1 14·9	92·3 7·7	92-9 7-1
Total	100.0	100.0	100.0	100.0	100.0	100-0	100.0	100-0

Shipments from the silver mines of Ontario to United States smelters amounted in 1921 to 1,024 tons of ore and concentrates with a silver content of 490,704\* ounces, as against 1,724 tons containing 675,918 ounces in 1920 and 4,901 tons containing 1,780,617 ounces in 1919. Complete detailed statistics of the 1921 shipments may be seen in the special chapter on the silver-cobalt mining industry.

The production in 1921 included in addition to the output of the silver camp, and the recovery at the Port Colborne and Deschênes refineries, 120,336 cunces of silver contained in gold bullion from the gold mines, as against 99,311 ounces in the previous year, 92,805 ounces in 1919, and 73,013 ounces in 1918.

### MANITOBA

The silver production in Manitoba has been derived from the gold and copper ores of The Pas District. Owing to the high freight rates and the poor transportation facilities no copper ores were produced in 1921, and it was only under the most favourable market conditions such as obtained in the great war that these ores could be mined at a profit. There was consequently very little silver produced during 1921. The total production during the year was derived from gold bullion and only amounted to 33 ounces. In 1920, when a considerable shipment of copper ore was made, the production was 15,510 ounces, valued at \$15,649, as against 20,700 ounces, valued at \$23,069, in 1919, and 13,316 ounces, valued at \$12,886, in 1918.

In addition to this 490,704 oz. contained in exported ores and concentrates there was a considerable quantity contained in exports of residues and matter from the South Ontario analysis.

### BRITISH COLUMBIA

The silver production in British Columbia amounted in 1921 to 3,350,357 fine ounces valued at \$2,099,133, as against 3,327,028 fine ounces valued at \$3,356,971, in 1920, or an increase of 0.7 per cent in quantity and a decrease of

37.4 per cent in value.

The chief sources of the silver production in this province are the silver-lead-zinc ores of the East and West Kootenays supplemented by the silver contained in the gold-copper ores of Rossland, the boundary and coast districts and also that derived from the Premier Gold Mine near Stewart and the Dolly Vardon Silver Mine at Alice Arm.

The production in 1921 included: (a) contained in blister copper, 549,596 ounces or 16.5 per cent; (b) contained in lead bullion, 1,090,643 ounces or 32.5 per cent; (c) in lead and zinc ores and concentrates exported, 151,234 ounces or 4.5 per cent; and (d) in gold, silver or copper ores exported 1,558,528 ounces

The corresponding figures for 1920 were (a) 1,145,165 ounces or 34.4 per cent; (b) 1,131,116 ounces or 34.0 per cent; (c) 713,125 ounces or 21.4 per

cent and (d) 337,622 ounces or 10.2 per cent.

# Production of Silver in British Columbia by Districts, 1919, 1920 and 1921\*

property.							N EW
	Α.	m	10	921	1		
-	7%			180		ĸu.	

	1919	1920	1921
Cariboo— Omineca division	72,573	103,020	3,745
Cassiar— Atlin Skeena, etc	920,413		1,808 1,563,999
Kootenay, East— Fort Steele division. Other divisions.	205,500 68,634		546,631 18,508
Kootenay, West— Ainsworth division. Slocan division. Nelson division Trail Creek division. Revelstoke, Trout Lake, and Lardeau.	167,453 1,556,714 44,280 27,788 2,994	738,515	115,772 188,142 2,130 60,184 3,871
Yale— Boundary. Similkameen Nicola Yale, Ashcroft, and Kamloops Lillooet	222,680 6,823 2,096 365	4,876 437	160,051
Southern Coast— Vancouver Island Mainland	9,936 94,870		605 7,943
Total	3,403,119	3,377,849	2,673,389

<sup>\*</sup>From the Minister of Mines Reports, British Columbia.

### YUKON

The silver production of the Yukon Territory in 1921 increased considerably on account of shipments of silver-lead ores being again made from the Mayo district.

In 1921 the production amounted to 393,092 fine ounces valued at \$246,288, as against 19,190 fine ounces valued at \$19,363 in 1920, and 27,556 ounces valued at \$30,621 in 1919. The production for 1921 was the highest yet recorded and was due to the activities of the Keno Hill Limited mines on Keno Hill. In 1915 and 1916, the yearly production was augmented by the output from the copper

mines of the Whitehorse and the gold mines of the Conrad districts. The respective percentages of silver won from lode and placer mining in 1921 were 96.2 per cent and 3.8 per cent, as against 14.6 per cent for lode mining and 85.4 per cent for placer mining in 1920. The figures for the former years were as follows: 1919, lode mining, 26 per cent; placer mining, 74 per cent; and for the years 1918, 1917 and 1916, lode mining contributed 68.2 per cent, 66.8 per cent, and 87 per cent, respectively.

On an average about one ounce of silver is contained in each five ounces of

crude bullion from alluvial workings.

### TIN

Tin ores have not yet been found in sufficient quantities in Canada to be of

economic importance.

The occurrence of tin ore has been reported from several localities, the most important perhaps being the discovery of cassiterite, near New Ross, Lunenburg county, N.S. Reports upon it may be found in the Summary Reports of the Geological Survey Branch of the Department of Mines for 1907, 1908, 1910, 1911, and 1912.

Cassiterite occurs in a few scattered crystals in pegmatite dykes in the drainage basin of McDougal creek, Lardeau division, B.C., and it has been found also in black sands in the Atlin district, B.C., and in the alluvial sands of

Dublin guleh, Mayo district. Y. T.

The occurrence of tin has been noted in some bodies of sulphide minerals found in the vicinity of West Hawk and Star lakes, near the boundary line between Ontario and Manitoba. Attention is called to these occurrences not on account of their commercial importance, but for the interesting manner of occurrence and the mineral associations.

Ores of tin which are imported from South America have in the past been reduced in Canada. The Electro Tin Products Company of Brantford, Ontario. although idle throughout 1921, formerly operated a plant for treating Bolivian tin ores. The plant comprised roasting furnaces, electric smelting and slag cleaning furnaces.

## Imports of Tin into Canada, 1919, 1920 and 1921

T	ABLE	1	ñ	ß
- 1	J. 12 1 2 1 2 1 2	- 1	v	u

Item	1919	192	20	1921	
Pounds	Value	Pounds	Value	Pounds	Value
	8		\$		\$
Tin in blocks, pigs and bars. Tin, foil	1 412,158 1 1,444 87,095 825,177 (b) 1,926	1,834,220 128,120	932,398	19,098	840, 278 330, 636 469 73, 070 481, 087 (c) 6, 913
Total	3,454,995		4,627,732		1,732,44

<sup>(</sup>a) Tinware, plain, japanned or lithographed, and all manufactures of tin, n.e.s,
(b) Covers first quarter of 1919, after April 1, 1919, tin crystals are included with "Bichloride of Tin."
(c) Included with "Bichloride of Tin."

#### TUNGSTEN

There was no production of tungsten in Canada during 1919, 1920 and 1921.

The year 1921 saw further decreases in the price of tungsten, which at the beginning of January was quoted at from \$4 to \$4.50. By the middle of the month it fell to \$3.25 and \$3.50 and remained at this point until September. During the last quarter of the year, the quotations were \$2.50 to \$3 with market conditions quiet.

### ZINC

The production of zinc in Canada during 1921 amounted to 53,089,356 pounds (26,544.6 tons) which at the average price for the year of 4.655 cents per pound, was valued at \$2.471,310, as against 39,863,912 pounds (19,932 tons), valued at \$3,057,961, or an average of 7.671 cents per pound in 1920.

The production in 1921 included: (a) 52,988,000 pounds refined zinc produced at Tadanac, near Trail, B.C., and (b) 101,356 pounds estimated as

recovered from ores and concentrates exported to the United States.

The production in 1920 included 37,034,000 pounds of refined zinc produced at Tadanac and 2,829,912 pounds estimated as recoveries from ores and concen-

trates exported.

During the year no zinc ores or concentrates were exported from Notre-Dame-des-Anges in Quebec which in 1920, was credited with 1,120,200 pounds. In former years residues from the milling of gold ores in Porcupine, Ontario which were treated abroad, contained zinc. In 1920 some 14,000 pounds was estimated as recovered but in the year under review no shipments of this kind were reported.

### Production of Zinc in Canada, 1911-1921

TABLE 107

Calendar Year	*Quantity	Value	Average price per pound
	Pounds	\$	Cents.
1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921	1,877,479 4,283,760 5,640,193 7,246,063 9,771,651 23,364,760 29,688,764 35,083,175 32,194,707 30,863,912 53,089,356	108,105 297,421 318,558 377,737 1,292,789 2,991,623 2,840,817 2,862,436 2,362,448 3,057,961 2,471,310	5-758 6-943 5-648 5-213 13-230 12-804 8-901 8-159 7-338 7-671 4-655

\*Estimated smelter recoveries, including for years 1916 to 1921 the actual zinc recovered at Trail, B.C.

The total shipments of zinc ores and concentrates from the mines in Canada in 1921, including the zinc-lead ores from the Sullivan Mine, East Kootenay, B.C. and ores exported to the United States, amounted to about 297,406 tons valued by the operators at \$1,498,716 or an average of \$5.04 per ton and containing 98,799,093 pounds of zinc.

In 1920 the shipments of ores and concentrates were 249,136 tons, valued by the operators at \$1,157,844, or an average of \$4.65 per ton, and containing

91,033,202 pounds of zinc.

Detailed statistics covering silver-lead-zinc mining are set forth in a special chapter describing that industry.

TABLE 108 Shipments of Zinc Ores from Canadian Mines, 1898-1921

Year	Zinc ore	shipped	Metallic zinc in ore shipped	Year	Zinc ore shipped		Metallic zinc in ore shipped
HILLIAN S	Tons	Value	Pounds		Tons	Value	Pounds
BATHING.	e quat	\$				\$	G. HIXI
1898. 1899. 1900. 1901* 1902. 1903. 1904. 1905* 1906* 1907* 1908*. 1909 †	1,162 865 261 158 1,000 597 9,413 1,154 1,573 452 18,371	11,000 18,165 4,810 1,659 10,500 3,700 139,200 23,800 49,100 3,215 242,699	814,000 212,000 142,200 900,000 477,568	1911 1912 1913 1914 1915 1916 1917 1918 1919 1920	5,063 2,590 6,415 7,889 10,893 14,895 82,077 116,489 121,200 135,535 249,136 297,406	120,003 101,072 215,1491 186,827 262,563 554,938 1,086,249 1,323,985 1,228,195 1,049,493 1,157,844 1,498,716	2,346,849 5,354,700 7,069,800 9,101,460 12,231,439 48,498,078 64,655,713 63,026,464 59,959,700 91,033,202

<sup>\*</sup>Figures not available.

The ores shipped also contained a varying amount of silver for which payment was made by the smelter and without which on account of the import duty to the United States and the long rail haul, it would not in many cases pay to ship.

TABLE 109

### Summary of Zinc Statistics, 1919, 1920 and 1921

	1919	1920	1921
Ores and concentrates shipped.  Zinc production.  Refined zinc product Imports of zinc (a).  Imports of brass and manufactures of value. Exports of " " " " " " " " " " " " " " " " " "	135, 535 \$1,049,493 15,097 \$2,362,448 12,326 13,223 \$2,131,176 \$4,257,738 \$1,685,941 6,630 \$296,212		
Exports of metallic zinc	3.847 \$701,249	3,490 \$512,279	12,828 \$1,336,389

<sup>(</sup>a) Includes manufactures of zinc valued at \$43,155 in 1919, at \$96,961 in 1920, and \$53,946 in 192).

Refining.—With the exception of a small production in experimental work there was no recovery of zinc spelter or refined zinc in Canada previous to 1916. The production of zinc was therefore recorded in terms of the tonnage of ore shipped and its metal contents. The establishment of an electrolytic refinery at Trail placed the metallurgy of this metal in Canada on a similar basis to that of lead and copper and its production has since been recorded in the same

The production of refined zinc at Trail in 1921 was 26,494 tons against 18,517 tons in the previous year, 12,326 tons in 1919, and 12,574 tons in 1918 and 9,985 tons in 1917, and 2,974 tons in 1916, or a total of 82,870 tons since operations were first started.

The zinc industry was made the subject of a special report in 1905 by a commission appointed to investigate the zinc resources of British Columbia,

and the conditions affecting their exploitation.1

In 1916 a brief report was made by Dr. A. W. G. Wilson, on the production of spelter in Canada, and conditions in connection with the home treatment of British Columbia zinc ore.2

<sup>†</sup> Includes 7,424 tons shipped late in 1908.

Mines Branch No. 12. Report of the Commission on the Investigation of the Zinc Resources of British Columbia. 1905. (Out of print).
 Mines Branch No. 428. Report on the Production of Spelter in Canada, 1916. Dr. A. W. G. Wilson.

A report on the zinc-lead deposits of Notre-Dame-des-Anges was made by J. A. Bancroft and published in the Annual Report of the Bureau of Mines, Quebec, for 1915.1

The Provincial Bureau of Mines of Ontario also published in 1916 a report

on the lead and zinc deposits of Ontario and Eastern Canada.2

During 1913 the new United States Customs tariff came into effect, considerably reducing the duties payable on Canadian ore, the new items affecting Canadian shipments being:-

"Zinc ores containing 25 per cent or more zinc: 10 per cent on zinc contained therein. Lead bearing ore: three-quarter cents per pound on lead contained

therein."

There is also a duty of 15 per cent on metallic zinc exported to the United States, and at present an import duty of 7½ per cent on zinc and other materials

imported into Canada from the United States.

Although not paid for by the United States smelters, the lead in ore is considered as dutiable and as there is often a small lead content in the zinc ore or concentrates shipped, the lead duty applies. Following the decrease in duties there has been a considerable increase in zinc shipments.

Imports into Canada of Zinc and Zinc Products, 1920-1921 Tone HO

THE RESERVE OF		1920			1921	
Zine and Zine Preducts	Product in Pounds	Value of Product	Zinc Content in Pounds	Product in Pounds	Value of Product	Zinc Content in Pounds
Zine, in blocks, pagazari sheets. Zine, as spolter Zine white (80% Zn.) Zine dust (90% Zn.) Zine, sulphate and chloride of (44% Zn.).	3,452,892 1,555,068 21,254,272 378,556 631,314	\$ 410,772 122,745 1,829,620 50,597 44,471	1,555,068		\$ 247,475 56,683 886,784 46,440 17,944	2,783,000 1,110,84 10,200,96; 340,700
Tetal		2,458,205 96,961	(11,314·9 tons)	(8,693-1 tons)	1,255,326 53,946	14,570 254 (7,285-1 tons)
Grand total		2,555,166			1,309,272	
Brass, in blocks, pigs and ingots (30% Zn.). Brass, old and scrap (30% Zn.). Brass, tubing (30% Zn.). Brass, plain wire (30% Zn.).	360,400 3,538,700 1,076,278 259,957	72,451 533,534 400,149 90,987	108, 120 1,061,610 322,883 77,987	5,362,900 735,302	16,860 289,724 194,794 64,125	1,608 870 220 591
Total		1,097,121	1,570,600 (785-3 tons)			(968-2 tons
Brass, bars and rods. Brass, strips, sheets or plates. Brass, wire cloth, n.o.p. Brass, cup for manuf, of shells. Brass, caps for electric batteries. Brass, hand-pumps.	1,482,200	525, 235 431, 236 485, 198 247, 698 7, 508 22, 258			5,073 21,081	
Bruss, nails, tacks, etc. Iruss and copper rivets, burrs and washers. Brass, valves. Brass, other manufactures, n.o.p.		9,050 35,789 562,153 2,914,529			39,373 186,036	
Total		5, 240, 654			2,955,999	
Grand total		6,337,775			3,521,502	

Geology of part of the Township of Montauban and Chavigny, and of the Seigneurie de Grondines, by

J. A. Bancroft, Annual Report of Province of Quebec for 1915.

<sup>2</sup> Lead and zum Deposits of Ontario and Eastern Canada, by W. L. Uglow, Annual Report of the Catacas, Parcella of Manys for 1915, Vol. XXV, Pact II.

#### DOMINION BUREAU OF STATISTICS

## Exports of Zinc and Brass from Canada, 1919, 1920 and 1921

T	191	9	1920	0	1921		
Items	Quantity	Value	Quantity	Value	Quantity	Value	
Zinc ore Tons Zinc spelter "	6,630 3,847	\$ 296,212 701,249	3,126 3,490	\$ 122,387 512,279	52 12,828	\$ 1,293 1,336,389	
Bruss— Old and scrap Lb. Rods, sheets and tubing	9,656,900	1,275,448 173,654 236,839	3,439,800	475,809 49,728 325,794	2,096,700 9,300	126,832 2,393 156,804	

There is at present in Canada only one company operating an electrolytic zinc plant, namely, the Consolidated Mining and Smelting Company of Canada, Limited, at Trail, B.C.

Two other experimental plants were operated during the war only. They were:—

- (a) The plant of the Electro Zinc Company which used the Watt's process and was designed to recover refined zinc from the orcs of Notre-Dame-des-Anges, Que.
- (b) The plant of the French Complex Ore Reduction Company, which used the French process, and was established near Nelson, B.C. This plant was idle during 1921.

The Trail plant of the Consolidated Mining and Smelting Company started regular commercial operations early in 1916, and in July it was reported to be producing 20 tons per day. Later in the year the company undertook to increase its capacity to 45 tons. Early in 1917 it was reported to be producing 45 tons per day, and its capacity is now rated at 80 tons.

## Production of Zinc in British Columbia by Districts, 1919, 1920 and 1921\*

(Contents of ore shipped in pounds)

Table 112

	1919	1920	1921
	46,460,703	42,881,092	49,319,198
Windermere—Golden Kootenay, West— Ainsworth	36.785	158, 193	62,629
Nelson Slocan	10,015,624		
Boundary-Yale— Kamloops, etc.			
Cariboo— Omineca	224,539	453, 152	11,561
	56,737,651	47, 208, 268	49,419,372

<sup>\*</sup>From the Minister of Mines Report, British Columbia.

Bounties.—An act to provide for the payment of bounties on zinc produced from zinc ores mined in Canada was passed by the House of Commons of Canada, May 3, 1916. This Act was cited as "Zinc Bounties Act, 1916."

A new Act was passed by the House of Commons of Canada, May 24, 1918, and cited as "The Zinc Bounties Act, 1918."

No bounties were paid until 1919, when \$108.563.32 was paid on 10.107.704 pounds of zine, covering the period from June, 1918, to March, 1919. During the fiscal year ending March 31, 1920, the amount of bounty paid on zine was \$249.246.04 and for the period March 31 to July 31, 1920, the amount paid was \$42,190.64. No bounties on zinc have been paid since the latter date.

Prices — The price of zinc in St. Louis averaged 4.655 cents per pound for the year 1921. In January, the price was 5.413 cents but it gradually declined to 4.186 cents in August, recovering in December to 4.837 cents. No quotations were published showing the New York prices. The difference is usually about one-half cent per pound, the New York quotations being greater.

### Monthly Average Price of Zinc (Spelter) at Montreal,† 1917-1921 (In cents per pound)

TABLE	1	1	3	
-------	---	---	---	--

	1917	1918	1919	1920	1921
January	10.74	8-48	8-00	11-284	6 - 561
February	11-27	8 - 50	7.215	11.275	6 - 607
March	11.64	8.17	7.03	9.856	6.680
April	10.45	7.51	6-968	10 - 279	6 - 588
May	10-19	7-87	6.954	9.812	6.809
June	20.16	8.62	7 - 624	9.817	6 -550
July	9-48	9-28	8.912	10.085	6.31
August	9-11	9.60	9.067	10 - 113	6-120
September	8-88	10.23	8-777	9 - 239	6-190
October	8-70	9 · 64	9.086	8.41	6 - 15-
November	8 - 50	9 - 24	9-489	7 - 759	6 - 55
December	8.35	9-04	10.289	6 - 769	6.673
Average	9.79	8.85	8-284	9 - 558	6 - 50

tProducers prices for carload quantities ex cars Montreal, as furnished by Messrs. The Consolidated Mining and Smelting Company of Canada, Limited, Montreal,

### Average Price of Spelter at New York and St. Louis,\* 1919, 1920 and 1921 (In cents per pound)

TABLE 114

Month	1919	1920	1921
anuary	7 - 272	9-483	5.41
ebruary	6 · 623	9 - 058	4 - 01
Iarch	6 - 500	8-881	4.7
.pril	6.464	8 - 534	4.7
ny	6 - 429	7.938	4.8
ine,	6.901	7.815	4.4
ıly.	7 - 873	8.070	4.2
ugust	7 - 789	8 - 185	4.1
eptember	7-510	7-717	4.3
etober	7 - 823	0.0	4-6
ovember	8-177	8.0	4-6
December	8.700	0.0	4-8
Average	7.338	7.671	4.6

<sup>\*</sup>From the "Engineering and Mining Journal-Press"; St. Louis price for 1921. \*\*No quotations for last three months 1920.

## Average Price of Spelter, Ordinary Brands, in London,\* 1919, 1920 and 1921

(In pounds sterling per long ton)

TABLE 115

Month	1919			1920			1	921	
Jannary Pebruary March. April May June. July August. September October November December.	£ 50 42 37 35 36 42 39 41 43 46 53	s 15 11 10 18 13 19 3 16 8 17 17	d 11 6 3 3 9 6 10 9 5 12 3 3	£ 59 62 54 48 46 42 41 40 40 35 28	s 10 3 16 9 0 2 13 19 5 5 14 11	d 47 8 5 9 11 4 6 6 6 8 6	£ 25 25 25 26 25 26 26 27	8 15 5 10 1 6 2 12 8 10 10 4 0	d75556722018881011
Average	42	5	3	45	4	6	26	4	1

<sup>\*</sup>From the annual publication of the "Metal Information Bureau," London, E.C.

### World's Production of Zinc, 1913 and 1916-1921\*

(In metric tons, by countries where smelted.)

TABLE 116

	1913	1916	1917	1918	1919	1920	1921
Australia—			40	2 000	0 705		4 50
Tasiciania		F 000	49	3,883	3,727	5,911)	1,79
Mainland	4,187	5,362	4,769	5,712	3,625	3,909	0.1
Austria	21,707	11,600	12,600	12,000	(a)	(a)	24
Belgium	204,220	22,930	10,290	9,245	19,860	84,260	66,47
anada		2,698	9,058	11, 139	11,182	16,798	24,03
France	67,890	20,258	22,929	18, 347	10,800	19,655	24, 35
Sermany-				100 001			
Upper Silesia	169,439	122,489	128,832	122,961	74,023	81,482	93,00
Other Germany	109,400	55,326	57,700	48,900	11,000	16,000	
Breat Britain	66,243	52,629	51,918	39,001	38, 227	25,000	5,77
taly	,	258	367	1,188	1,282	1,172	38
apan	900	38,994	54,718	39,915	19,816	10,885	7,00
ugoslavia and Czechoslova-							
kia	(5)	(b)	(b)	(b)	4,010	6.000	9,06
Netherlands	24,323	12, 101	4,059	681	-,	2.031	6.40
		1.833	1,752	1,855	3,386	1,837	(c)
Norway	9,287						
oland	(d)	(d)	(d)	(d)	4,652	5,361	6,00
Russia	10,500	1,100	8,334	4,893	(e)	(e)	(e)
iberia		213	569	(0)	(c)	(c)	(c)
pain	6,003	8,523	10,155	15,900	16,314	9,647	3,00
weden	2,115	9,997	7,979	4,098	2,321	5,759	(6)
Inited States	314,498	606, 307	607,423	469,853	422,513	420,366	181,89
Known output	1,010,700	972,600	993,500	810,000	647,000	716,000	

<sup>(</sup>a) See Jugoslavia and Czechoslovakia. (b) Included in Austria. (c) Statistics not available. (d) Included in Russia. (e) See Poland. \*From U.S. Geol. Survey Report.

## NON-METALLICS

### ABRASIVES

### CORUNDUM

Shipments of grain corundum during 1921 amounted to 403 tons, or 44 per cent more than the sales reported for the previous year. Some 11,256 tons of old mill tailings were treated, from which approximately 407 tons of grain corundum was recovered, the percentage of recovery being 3.6 per cent as against 2.5 per cent in 1920.

Corundum is found in an area embracing several townships in Renfrew and Hastings counties, in the province of Ontario. The industry made its appearance there in 1900, the production reaching a maximum in 1906. From 1907 to 1913 the yearly production was smaller, but fairly uniform. Operations were indefinitely suspended during August, 1918, but were renewed again in 1919, since which time old tailings have been treated for the recovery of grain corundum.

### Corundum Production in Canada, 1917-1921

(In Short Tons)

TABLE 117

Calendar	dum- dum- bearing	Grain	%		Grain Co	rundum		Average
Year	rock treated		Recovery Sold in Canada		Exported	Total	Total value	cents per pound
1917. 1918. 1919. 1920.	4,659 3,184 1,300 (a) 13,025 (a) 11,256	137 26 322		16 0 0 20 0	172 137 0 176 403	188 137 0 196 403	\$ 32,153 26,112 0 24,547 55,965	8-55 9-9 0- 6-25 6-94

<sup>(</sup>a) Tailings only.

#### GRINDSTONES. PULPSTONES AND SCYTHESTONES

The provinces of Nova Scotia and New Brunswick continued to be the only producers of grindstones in Canada; the latter province also, produced pulpstones and scythestones. Shipments for 1921 totalled 1,281 tons valued at \$64,607 or a decrease of 48 per cent in quantity and 27 per cent in value from the sales for 1920.

Grindstones were marketed in Canada and United States at prices ranging from \$30 to \$40 per ton, while the prevailing prices during the previous twelve months were \$30 to \$62 a ton.

The firms reporting operations were, the Mic Mac Grindstone Company, Limited, Woodburn, N.S.; the Miramichi Quarry Company Limited, Quarry-ville, N.B.; and the Read Stone Company, Stonehaven, N.B.

Production, Imports and Exports of Grindstones, 1919, 1920 and 1921
TABLE 118

	191	19	, 19	20	19:	21
	Quantity	Value	Quantity	Value	Quantity	Value
The American		\$		\$		\$
Production— Nova Scotia Tons New Brunswick	283 1,737	9,000 51,516		8,440 79,696		6,990 57,077
Total	2,020	60,516	2,444	88, 136	1,281	64,067
Imports— Grindstones Burrstones in blocks,						448,055
etc	1,106	3,421	, 343	1,655	668	4,844
or ground Emery and carborundum		38,106		69,462		44,490
wheels and manufac- tures		316,322		471,853		197,049
ground		29,910		57,068		21,528
Iron sand or globules for polishing and sawing Sandpaper, emery paper,				17,000		13,723
Artificial abrasives		362,069 82,866		560,180 251,260		252,804 74,083
Stone for the manufacture				41,705		24,915
of grindstones Tons Abrasives—					91	2,686
Natural, n.o.pCwt. Artificial, crude, includ-	8,529	10,743	81,330	236,569	34,285	83,773
ing carborundum Cwt.		1,040,132	598,664	1,579,508	139,146	522, 531
Artificial, made up into wheels, stones, etc		14,858		41, 138	,	18,752

### TRIPOLITE

Tripolite is a silicious material closely related to quartz and is used extensively as an abrasive product. It is calcined in rotary furnaces before shipment to the United States for further treatment. The total Canadian production is derived from deposits located at Silica Lake, Colchester County, Nova Scotia.

Shipments of tripolite during 1921 were considerably higher than those of the previous year, amounting to 341 tons with a value of \$11,268. The average price of \$33 per ton which prevailed during 1920, continued throughout the following year.

Tripolite in Canada, 1919, 1920 and 1921

PERM			4 4	. 0	
	F.C.	To	-10	156	(a)

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
Production	565	\$ 11,300	260	\$ 8,600	341	\$ 11,268

### ACTINOLITE

The milling of actinolite was carried on during only 123 days in 1921 during which time a total of 109 tons was milled and a total of 78 tons was ground and bagged for shipment. The crude ore was quoted at \$6 a ton, but the mill product commanded a somewhat higher figure, the value of the shipments totalling \$975, an average of \$12.50 a ton.

Production of actinolite in Canada has been confined to Elzevir and Kaladar townships, in Hastings and Addington counties, province of Ontario, the

centre of the industry being Actinolite.

Actinolite is used as an ingredient for coal-tar roofing compounds, the grinding of the crude material being done in such a way as not to destroy the fibre.

The only shipper was the Actinolite Mining Company of Bloomfield, New Jersey, U.S.A. This company owns the deposit noted, and also a grinding mill at Actinolite.

## Production of Actinolite in Canada, 1919, 1920 and 1921

LABLE	172		

	19	19	19:		19	21
			Tons	Value		
Production	80	\$ 880	100	\$ 1,160		\$ 975

### ARSENIC

There was a decrease of approximately 25 per cent in the production of arsenic during 1921, as compared with the previous year. Shipments reported for the year totalled 1,491 tons, valued at \$233,763, and consisted entirely of white arsenious oxide produced in the smelting of silver-cobalt-nickel ores from the Cobalt district. During 1920 a considerable quantity of arsenic was recovered from the arsenical gold concentrates shipped by the Hedley Gold Mining Company to the Tacoma smelter, but during the period under review the Hedley Company did not carry on any operations. The Howrey Creek Gold Mining Corporation in Ontario (Sudbury district) also made some trial shipments of gold concentrates in 1920 but did not operate during the year just closed.

White arsenie (As<sub>2</sub>O<sub>3</sub>) is used principally in the manufacture of insecticides, such as lead arsenate, paris green, calcium arsenate, london purple, and cattle and sheep dips. It is also used in the glass industry for the purpose, it is said, of imparting brilliancy to the product. In addition to these uses, a small quantity is consumed in the tanning, dyeing and pharmaceutical industries.

During 1921, the price of white arsenic dropped from 11 cents in January to 7½ cents per pound in December, the average for the year being 8.85 cents. The price during the previous year ranged from 9 cents to 14½ cents per pound with an average of 12 cents for the period. These quotations were taken from the Engineering and Mining Journal-Press.

## Production, Exports and Imports of Arsenic, 1919, 1920 and 1921

	19	19	19:	20	19	21
	Tons	Value	Tons	Value	Tons	Value
Production—		S		\$		\$
From arsonical concentrates While arsonic	530 2,859			22,231 425,617		233,763
Total	3,389	509,924	2,459	447,848	1,491	233,763
Exparts Arsenic	2,506	355, 654	1,655	313, 311	767	108, 535
Imports— White arsenic Sulphide of arsenic Arseniate of such	Pounds 4,706 304,694 5,566	1,325 26,613 1,661	337,158	201 43,445 10,568		230 26,348 3,002

### ASBESTOS

The total quantity of asbestos rock mined during 1921 amounted to 2,063,-821 tons which was approximately the same quantity as in 1917, but was about one million tons less than the 1920 record, of 3,142,827 tons. Of the rock raised, 1,673,685 tons, or 81 per cent, was milled and 123,377 tons was recovered of which 75 per cent, or 92,761 tons, was sold at an average value to the mine operator of \$52.89 per ton. During the previous year the corresponding average value per ton was \$74.12.

As in previous years the entire production was derived from the well known

deposits in the Eastern Townships of Quebec.

During the year some prospecting work was done on a deposit of chrysotile asbestos near Arrowhead, in the Landeau Mining Division, British Columbia. It was reported that the short-fibre asbestos found on this deposit did not possess sufficient tensile strength to permit its use for spinning purposes but it was stated that it should be suitable for use as a filler for textiles.

Canadian exportations of asbestos (crude and milled) during 1921 were as follows: to United Kingdom 4,423 tons valued at \$512,009; to United States 43,374 tons at \$2,878,172; to Australia 175 tons at \$21,438; Belgium 3,524 tons at \$418,518; France 1,932 tons at \$348,504; Germany 3,437 tons at \$493,024; Italy 230 tons at \$32,100; Japan 1,842 tons at \$148,430; Netherlands 3,923 tons at \$560,873 and to other countries 480 tons valued at \$52,243.

Output, Sales and Stocks of Asbestos in Canada, 1921

		S	old or Shippe	d	Quantity in stock	
Chamilication	Total output	Quantity	Total sales value at mill	Average value per ton	on hand at end of period	
	Tons	Tons	S	2	Tons	
Crede No. 1	653	222	273,007	1,229-76	879	
Chade 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	10,99G	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 Ey-Products (asbestos sand, finish,	27,199	20,262	308,379	15.22	10,396	
deals)	27,474	25,428	141,419	5 · 56	6,741	
Total	123, 377	92,761	4,906,230	52-89	52,288	

### Summary Statistics on Asbestos, 1919, 1920 and 1921

Table 122

	191	19	19:	20	19	21
	Tons	Value	Tons	Value	Tons	Value
*		\$		8		S
Rock mined			3,142,827 2,668,946		2,063,821 1,673,685	
Output— Milled Crude					120,983 2,394	
Total	157, 572		169,446		123,377	
Mill recovery %	5-8		6-2		7 - 3	
Asbestic*	136,765 22,471	10,909,452 65,917	178,617 20,956	14,734,599 57,602	67, 333 25, 428	4,764,811 141,419
Total	159, 236	10,975,369	199,573	14,792,201	92,761	4,906,230
Imports		656,037		1,047,031		575, 153
Exports— Asbestos Sand and waste Manufactures	119,122 25,306	9,625,695 260,778 232,501	152,740 36,303	11,521,536 365,920 196,067	63,340 22,054	5,465,311 215,961 261,274
Total		10, 118, 971		12,083,523		5,942,540

<sup>\*</sup>Includes "floats" in 1921.

### BARYTES

The shipments of ground barytes in Canada during 1921 amounted to 270 tons valued at \$9,567, as against 751 tons at \$22,983 for the previous year, and were made from the mill operated by the Brandram-Henderson, Ltd., in connection with the barytes deposit leased by them at Lake Ainslie, Inverness County, Nova Scotia.

The total quantity of barytes mined during the year was 425 tons, of which amount, Nova Scotia contributed 225 tons and Ontario, the balance. The Ontario output was from a deposit located in North Burgess Township, owned by Mr. H. C. Bellew (now known as the Bellew Barytes Mines, Limited). No shipments were made from the Ontario deposit. The following table shows the production and imports of barytes and barium compounds over a period of three years.

Production and Imports of Barytes in Canada, 1919, 1920 and 1921

	19	19	19	20	19:	21
	Tons	Value	Tons	Value	Tons	Value
Preduction		\$		s		\$
Nova Scotia	468	8,154	751	22,983	270	9,567
Imports Barium peroxide Blanc fixe and satin white Barytes	3.718	114,732	2,429	102, 198	1,418	26,901 61,624 40,374

<sup>(</sup>a) Not separately classified previous to April, 1919.

#### CHROMITE

Shipments of chrome concentrates during 1921 amounted to 2,798 tons, valued at \$55,696, as compared with 11,016 tons at \$251,379 for 1920, a decrease of 15 per cent in quantity and 22 per cent in value. The average value obtained during the year was \$19.90 per ton, or appreciably less than the average return in the previous year of \$22.82 a ton.

The mine owned by the J. V. Belanger Mining Company in Coleraine township closed down early in the year after operating for a few months. In June this mine was reopened by the Union Chrome Mining Company, which firm carried on operations for some time. In November, this property was purchased by the United States Ferro-Alloys Corporation at a sheriff's sale.

Minor shipments were made during the year from stock by the Mutual Chemical Company of Canada, Limited, and the Black Lake Asbestos and Chrome Company. In 1918 some shipments of chromite were made from the Mastadon claim in the Grand Forks Division, British Columbia, but since that date this property has not been operated.

### Production, Imports and Exports of Chromite, 1919, 1920 and 1921 TABLE 124

	19	19	195	20	192	21
	Tons	Value	Tons	Value	Tons	Value
		\$		8		Ś
Production— Quebec	8,541	228,898	11.016	251,379	2,798	55,696
Imports— Bichromate of soda Bichromate of potash	502 29	113,478 19,525		267, 235 5, 650		59,557 9,070
Experts	9,078	198,733	8,431	151,456	2,387	32,747

### COAL

In another bulletin entitled "Coal Statistics for Canada," much more complete data on coal are given, but the following abstracts are included as of

general interest.

The output of coal from Canadian mines during the twelve months ending December, 1921, amounted to fifteen million short tons valued at \$72,451,656 or \$4.81 per ton. This quantity was 88 per cent of the amount mined during the preceding year, when the total output was 16.9 million tons. In 1919 a total of 13.9 million tons of coal was raised so that although the output of 1921 was 12 per cent lower than in the preceding year, it was more than a million tons in excess of the 1919 production. The highest monthly output recorded was for November when more than 1.5 million tons was mined; the lowest was in April, the total for the month being half a million tons less, or 932,747 tons.

Alberta held the premier position among the coal-producing provinces, with an output of 5.9 million tons. Nova Scotia followed closely with 5.7 million tons. The output of coal from the mines of British Columbia amounted to 2.8 million tons, while Saskatchewan mined 335,632 tons, and New Brunswick 187,192 tons.

An analysis of the disposition of coal during the year shows that 57 per cent was shipped; 23.72 per cent went to railroads for locomotive consumption; 7.43 per cent was used about the colliery for power purposes; 5.95 per cent was sold for ships' bunkers; 1.10 per cent was put on bank; 2.30 per cent was put on the waste dump; 1.5 per cent was supplied to employees for domestic consumption; 0.6 per cent was used in the manufacture of coke at the collieries; 0.3 per cent was used in making briquettes. Included in quantities referred to in the disposition was 197,604 tons, lifted from bank during the year.

Output and Disposition of Coal from Canadian Mines in 1921
Table 125

	Per cent of Total	Total	Total Value	Average Value per ton
Supplied to employees for domestic consumption Used for power purposes (colliery boilers, com-	1.56	Tons 237, 624	\$ 647,134	\$ 2.72
pany's railroads, etc.)	7.43	1,133,668	3,795,151	3 - 35
(a) Ship's bunkers	5-95	907,425		
(b) Railroads	23.72	3,619,197		
Shipments of coal	57-00 0-63	8,695,400 95,923		4.97
Used in making coke at colliery Used in making briquettes	0.31	47, 240		5 · 17 2 · 43
Put on bank	1.10	168,392		4.79
Put on waste heap	2.30	350, 228	94, 219	
Total disposition	100.00	15, 255, 097		
Lifted from bank		197,604	662, 618	3.35
Total output		15,057,493	72,451,656	4-8

<sup>\*</sup>Value of coke manufactured.

In computing the values recorded in the preceding table the actual income from coal sold or shipped has been given. This value has in all cases been exclusive of delivery charges and has been based on the value obtained f.o.b. The value for the other items have been computed, for the various amounts given, at the same rate as was obtained for similar products sold by the operator.

The output of coal in Canada during each of the past three years has also been compiled by kinds and provinces. For convenience of reference the output during 1920 has in each case been taken as 100 and the corresponding percentage or index number has been calculated for the other two years.

These data are given in the table on the following page:—

Output of Coal for Canada by Kinds and Provinces, 1919, 1920 and 1921 Table 126

	1919		1920	)	1921	921	
Provinces	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.	
Nova Scotia-							
Bituminous	5,790,196	90	6, 437, 156	100	5,734,928	89	
New Brunswick—							
Bituminous	166,377	97	171,610	100	187, 192	109	
SASKATCHEWAN-	n=u 0.=		008 000		DUE 000	100	
Lignite	379, 347	113	335,222	100	335,632	100	
ALBERTA	(VE =P)	,, <del>-</del>	107 710	100	00 041	76	
Anthracite	85,579	67 67	127.512	100	96,964	84	
Bituminous	2,285,957	76	3,419,147	100	2,867,833	88	
Lignite	2,562,124 4,933,660	71	3,361,105 6,907,765	106	2,944,420 5,909,217	96 86	
Total Alberta	4. 3660, 000	1.1	0,307,10	10%	0,000,211	30	
Bituminous	2,649,516	86	3,095,011	100	2,890,870	92	
YUKON	ary Octob art O	(33)	0,000,011	100	2,000,010	U ad	
Bituminous					233		
Total Dominion					2000		
Anthracite	85, 57!	67	127,513	100	96,964		
Bituminous	10,892,046	831	13, 122, 924	100	11,630,824	89	
Lignite	2,941,471	80	3,696,327	100	3,280,052	89	
Grand (otal	13,919,096	82	16,946,764	100	15,057,493	88	

In the period under review Canada exported nearly two million tons of coal or a little more than 13 per cent of the quantity actually mined. The amount exported was only 78 per cent of the total shipped for foreign trade

in 1920, and even fell slightly below the amount exported in 1919.

Reference to the tables of exports herewith shows that more than 1.1 million tons of eoal was exported through British Columbia ports during 1921. This was only one per cent less than in the previous year. It is to be remembered that these data do not show the province of origin but only the port of exit to the United States, and as the bulk of coal exported from Alberta is shipped through the Customs ports of Fernie and Cranbrook, it will be understood that the total exported coal credited to British Columbia ports was not all mined within that province. In the final report on coal statisties. the quantities shipped for export trade from the mines of each province are shown. A total of 727,787 tons was exported through Nova Scotia ports and about 71.698 tons through New Brunswick ports. Exports from the other provinces of Canada were negligible. The total exports of Canadian coal have been compiled in Table 127, to show the quantities exported from each of the provinces of Canada during the past three calendar years. For convenience of reference as before the quantities have been reduced to percentages of the 1920 exports so that the reader may note the rise or fall of exports from each province in relation to the exports from that province in 1919 and 1921.

Exports of Canadian Coal by Provinces, 1919, 1920 and 1921 Table 127

	1919		1920	)	1921		
Provinces	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.	
Nova Scotia	994.107	80	1,245,673	100	727,787	58	
New Brunswick	59,090	52	113,050	100	71,698	6	
Prince Edward Island			2	100	2	10	
Quebec	929	68	1,372	100	85	-	
ntario	5.				10		
Innitoba	167	23	721	100	1,690	23	
askatchewan	389	12	3,132	100	2,633	8	
lberta	1,022	33	3,106	100	843	2	
British Columbia and Yukon	1,014,341	85	1,191,167	100	1,182,528	9	
Total	2,070,050	81	2,558,223	100	1,987,276	7:	

Imports of Coal into Canada by Kinds and Provinces, 1919, 1920 and 1921 Table 128

Description	1919		1920		1921	
Provinces	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No.
Nova Scotta— Anthracite Bituminous	60,095 4,076	133 134	45,334 3,044	100 100	62,245 1,875	137 62
Total	64,171	133	48,378	100	64,120	133
NEW BRUNSWICK— Anthracite. Bituminous	66,898 11,751	116 1,255	57,859 936	100 100	82,509 41,950	143 4,482
Total	78,645	134	58,795	100	124, 459	212
Prince Edward Island— Anthricite Bituminous	9,574 142	173 28	5,544 513	100 100	6,643 238	120 46
Total	9,716	160	6,057	100	6,881	114
QUEBEC— Anthracite Bituminous	1,378,460 2,673,819	89 76	1,544,456 3,503,410	100 100	1,311,712 2,684,566	85 77
Total	4,052,279	80	5,047,866	100	3,996,278	79
CENTRAL ONTARIO Anthracite Bituminous	2,978,472 7,700,935	101 74	2, 945, 782 10, 373, 324	100 100	2,809,327 8,733,828	95 84
Total	10,679,407	80	13, 319, 106	100	11,543,155	87
HEAD OF LAKES— Anthracite Bituminous	465,676 1,547,784	157 79	295,682 1,963,575	100 100	260,890 1,975,918	88 101
Total	2,013,460	89	2, 259, 261	100	2, 236, 808	99
Manitoba— Anthracite	12,906 62,746	74: 144	17,509 43,547	106 100	33,473 76,833	191 176
Total	75, 652	124	61,056	100	110,306	181
Manitoba and Head of Lakes— Anthracite	478,582 1,610,530	153 80	313, 191 2,007, 116	100 100	294,363 2,052,751	94 102
Total	2,089,112	90	2,320,307	100	2,347,114	101
SASKATCHEWAN Anthracite. Bituminous	1,406		206 535	100 100	254 2, 127	123 398
Total	1,406	190	741	100	2,381	312
Alberta— Anthracite Bituminous	66 1, 131	13 186	517 607	100 100	66 1,820	13 301
Total	1, 197	106	1, 124	100	1,895	169
British Columbia and Yukon— Anthracite	136 6,700	181 51	75 13, 137	100 100	251 17,086	335 130
Total	6,836	52	13, 212	100	17, 337	131
Canada— Anthraeite Bituminous	4,972,283 12,010,490	101 76	4,912,964 15,902,632	100 100	4,567,370 13,536,250	93 85
Total	16,982,773	83	20,815,596	100	18,103,620	87

Total Output of Coal from Canadian Mines, 1919, 1920 and 1921  $_{\rm TABLE~129}$ 

36 43	191	9	192	0	1921		
Months	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No	
January	1,337,852	83	1,606,238	100	1,372,734	8	
February		87 96	1,308,221 1,309,376	100 100	1,214,839 1,142,581	9 8	
March April	0 1144 000	88	1,189,856	100	932,747	7	
May	951,957	81	1,170,074	100	992,901	8	
June,		46 52	1,351,708	100	1,106,932 1,170,067	8	
July August	000 105	60	1.372.601	100	1,519,025	11	
September		88	1,449,205	100	1,321,214	9	
October	1,566,472	111	1,414,227	100	1,407,944	10	
November		90	1,748,109	100	1,522,027	8	
December	1,628,261	96	1,700,864	100	1,354,482		
Total	13,919,096	82	16,946,839	100	15,057,493	8	

## Total Exports of Canadian Coal, 1919, 1920 and 1921

TABLE 130

34 .3	191	9	192	0	1921		
Months	Short Tons	Index No.	Short Tons	Index No.	Short Tons	Index No	
January	465,568	140	332,763	100	185,297	5	
February	84,686	58	145,004	100	86,503	6	
March	129,614 53,956	51 45	252, 189 118, 592	100	177, 209 79, 014	6	
April May	108,211	55	195, 494	100	131,650	(	
June	106,460	45	234,915	100	209,331	{	
July	82, 103	63	129,801	100	289, 199	2:	
August	103,610	25	422,021	100	225, 301		
eptember	186,227	94	198,651	100	149,845		
October	243,591	121	201,655	100	179, 157		
November	267,427	155	172, 169	100	134,864		
December	238,597	154	154,969	100	139,906		
Total	2,070,050	81	2,558,223	100	1,987,276		

# Total Imports of Coal into Canada from the United States, 1919, 1920 and 1921

TABLE 131

Month	191	9	1920			1921		
Months	Short Tons	Index No.	Short Tons	Index	No.	Short Tons	Index No	
January	1,377,463	155	889,209		100	1,698,541	19	
February	1,068,781	124	865, 169		100	1, 195, 276	13	
March	784, 171	55	1,432,815		100	1,202,631	- 8	
April	603,099	62	974, 298		100	853,358	8	
May	1, 198, 127	116	1,033,361		100	1,439,297	13	
June	1.692.116	108	1,573,857		100	1,930,143	12	
July	2.049.735	90	2,284,448		100	1,905,694	8	
August	2,113,305	80	2,629,656		100	1,950,833	7	
September	2, 161, 195	100	2,159,081		100	1,551,188	7	
October	2,023,897	85	2,387,571		100	1,507,737	6	
November	1,251,418	51	2,467,622		100	1,510,934	6	
December	659,466	31	2, 118, 509		100	1,357,988	6	
Total	16,982,773	82	20,815,596		100	18, 103, 620	8	

Imports into Canada of Anthracite and Bituminous Coal from the United States, 1919, 1920 and 1921

		E		3

25		191	9			192	0			192	1	
Months	Short 7	Tons.	Index	No.	Short To	ons.	Index	No.	Short	Tons	Index	No
Anthracite—	399.	202		111	359.	497		100	200	.853		9
January.	347.			118	294.9			100		671		10
February	170.			39	440,			100		373		10
March	209.			80	263.0			100		.502		10
April	461.			136	338.3			100		,841		1:
May	430.			91	472.			100		592		10
June	537.			96	561.5			100		.904		31
July	586.			98	596.			100		,805		,
August	562.			151	371.			100		,500		-
September	446.			106	419.			100		. 861		
October												
November	377,			90	419,			100		,863		
December.	441,	214		117	376,	205		100	385	605		10
Total Anthracite	4,972,	283		101	4,912,	964		100	4,567	.370		1
Bituminous -												
January	977,	777		185	529.	782		100	1,369	688		2
February	720.			126	570.	266		100		605		1
March	613,			62	992,			100	818	3,258		
April				55	711.			100	578	3.856		
May				106	695.	040		100	980	1,456		1
June	1,261,			114	1.101.			100	1,423			1
July				88	1,722.			100	1,410			
August	1,526,			75	2.033.			100	1.531			
September				89	1,787.			100	1,199			
October				80	1,968,			100	1, 183			
November				43	2,048.			100	1.174			
December				13	1,742.			100		2,383		
Total Bituminous	12,010	400		76	15,902.	632		100	13,536	3 250		-

In table 133, entitled "Coal Made Available for Consumption in Canada," the total quantities of coal mined in each month have been added to the total quantities imported as shown on the records supplied by the Department of Customs. From this aggregate there has been deducted the quantity of coal exported through the ports of Canada during the month. The quantity remaining, while not absolutely equivalent to the quantity of coal made available for consumption during each of the months reported, is an approximation which as nearly corresponds to the actual coal made available as it is possible to obtain. Reference to table 133 will show that the quantity for the months of the period varied from 70 per cent of the amount available during the same month of the preceding year to 133 per cent, and that the total coal supply for the year 1921 was 89 per cent of that available at the end of December, 1920, but was in excess of the coal supply at the end of 1919.

## Coal Made Available for Consumption in Canada, by Months, 1919, 1920 and 1921

TABLE 133

Months	1919			1920			1921					
ALCHILLO	Short	Tons	Index	No.	Short	Tons	Index	No.	Short	Tons	Index	No.
January	2,249	747		104	2,162	684		100	2.885	078		133
February	2,120			105	2,028			100	2.323			114
March	1,910	3,081		77	2,490			100	2,168			87
April		,431		78	2,045			100	1,707			83
May	2,041			102	2,007			100	2,300			114
June	2,209			82	2,690			100	2,827			105
July	2,654			76	3,481			100	2,786			80
August	2,835			79	3,580			100	3,244			91
September	3,258			95	3,409			100	2,722			80
October	3,346			93	3,600			100	2,736	.524		76
November	2,557			63	4,043	,562		100	2,898	,097		72
December	2,049	, 130		56	3,664	,404		100	2,572	,564		70
Total	28,831	,819		82	35, 204	,212		100	31,173	,837		89

### **FELDSPAR**

Shipments of feldspar during 1921 were slightly less than those of the previous year, amounting to 29,868 tons valued at \$230,637. Sales during 1920 totalled 37,873 tons with a value of \$280,895. Ontario deposits, in the counties of Frontenae and Hastings contributed 20,115 tons, or approximately two-thirds of the tonnage shipped. The production of feldspar from Ottawa and Labelle counties in Quebec, was greatly increased over the output of the preceding year and the shipments amounted to 9,737 tons in 1921 as against 649 tons in 1920. A deposit of orthoclase feldspar was located in 1920 near Beach Hill Settlement, Halifax County, Nova Sectia and a trial shipment of some 16 tons was made during the period under review.

The total quantity of spar mined during the year was 35,678 tons, comprising 23,625 tons in Ontario, 11,853 tons in Quebee, and 200 tons in Nova Scotin.

The grinding plant at Ashbridges Bay owned by the Feldspar Milling Company of Toronto, was operated throughout the year. The capacity of this plant is about 6,000 tons per annum. A new plant with a capacity of 1,500 tons a year was completed by the Frontenae Floor and Wall Tile Company at Kingston, Ontario, and made ready for operation by the close of the year.

The average selling value of crude spar during the year was \$7.30 per ton, or 12 cents less than in 1920. Crushed spar brought \$10.60 per ton; Ground

No. 1, \$21.50; and Dental, \$32.50.

The following table shows the production by provinces, together with the total imports and exports of this commodity during the last three years.

Production, Imports and Exports of Feldspar, 1919, 1920 and 1921
Table 134

	1919		1920		19:	21
	Tons	Value	Tons	Value	Tons	Value
Production (shipments)— Nova Scotia	. , , , , ,	\$		\$	16	\$ 117
QuebecOntario	13,754		37,224	10,052 270,843	20,115	150,457
Total			1,991	280,895	1,050	25, 120
Exports			38,768	219,744	27, 293	169,864

<sup>(</sup>a) Last 9 months.

### FLUORSPAR

The production of fluorspar in Canada in 1921 declined to less than half the amount recorded for 1920 and reached about the same level as in 1919. The total shipments during the year amounted to 5,539 tons valued at \$136,267. The principal producer was the Consolidated Mining and Smelting Company, which operated the Rock Candy Mine at Archibald, near Grand Forks, B.C. At this mine a total of 6,742 tons of fluorite ore was raised and 5,772 tons was milled in the decrepitation plant located at the mine. Rejects from the Rock Candy mill were retreated by flotation at Trail and during the year a total of 6,291 tons was handled in this way. From these two processes concentrates were produced. The shipments of concentrates from the mill amounted to 3,367 tons valued at \$82,811 or an average of \$24.50 a ton. The concentrates shipped from the flotation plant amounted to 1,909 tons and were valued at \$4,963, an average of \$26 a ton. The total shipments from Trail thus amounted to 5,276 tons. A small tonnage was also used for experimental purposes.

Ontario was the only other fluorite producing province, but no ore was mined during the year. Shipments amounting to 116 tons were made by two of the operators in the Madoc District, the value of these shipments being \$1,744, an

average of about \$15 per ton.

In 1920 Ontario produced 3,750 tons out of a total of 11,235 tons, the balance being made up from the mines of British Columbia. Thus it will be seen that the great drop in the production of fluorspar in Canada during the past year was very largely due to the absence of production in Ontario as the shipments from British Columbia amounted to over 5,000 tons as compared with a total of about 7,400 tons in the preceding year. The decline in Ontario was due mostly to the diminished demand for fluorite as a flux in steel furnace work. The principal statistics relating to the production and trade in fluorspar are given in the following table.

Production, Imports and Exports of Fluorspar, 1919, 1920 and 1921

r	A	k	l.	E	1	3	5	

	19	19	1920		1921	
	Tons	Value	Tons	Value	Tons	Value
•		8		\$		\$
Production— Ontario British Columbia	3,425 1,638	59,281 38,556		68,475 171,971		
	5,063	97,837	11,233	240,446	5,539	136, 267
Imports— Hydro-fluo-silicic acid	2·8 (a)8,273 (a) 697	747 84,702 9,616		409 113,818 109,683		21 <b>2</b> 43,752 51,470

<sup>(</sup>a) Last 9 months

### GRAPHITE

Natural Graphite.—The production of graphite in Canada during 192! was practically negligible, the entire mine output being 1,500 tons, all of which was raised from the Black Donald mine at Whitefish Lake, fourteen miles west of Calabogie, Ontario. The total shipments from all graphite properties in Canada during the year amounted to 937 tons valued at \$65,862. These shipments consisted of 149 tons No. 1 and No. 2 flake, valued at \$29,187, and 788 tons No. 3 flake and dust, valued at \$36,675.

The Black Donald Graphite Company, Ltd., and the Quebec Graphite Company, were the only firms that reported shipments for the year. None was mined by the latter company, shipments being made from stock. At the close of the year stocks aggregating 700 tons remained unsold at the mines.

During the year a new firm "The Standard Graphite Company" commenced development work on its property located on lots 29, 30 and 31. Range VI of the township of Bover, a few miles from Guénette Station on the C.P.R. line to Mont Laurier. The ore is high-grade, and will be treated in the mill, the construction of which was commenced during 1921. This mill will be operated

by water power developed on the property.

The collapse of the graphite industry in Canada was but a reflection of the conditions prevailing in this industry throughout the world, for probably never before in the history of the industry were conditions so deplorable. The demand for crucible steel for war purposes created an unusual demand for graphite crucibles and many new graphite mines were developed in all parts of the world. At the close of the war many steel manufacturers had large supplies of crucibles on hand, manufacturers were carrying excessive stocks. and graphite producing companies found themselves with supplies of refined and crude graphite sufficient to meet even the inflated needs of war-time for months and in some cases, years. The surplus has not yet been exhausted, and as a consequence no demand has developed.

Production, Imports and Exports of Graphite, 1919, 1920 and 1921 TABLE 136

	19	19	192	0	192	1
depose to a	Tons	Value	Tons	Value	Tons	Value
Ore milledOutput, milled graphite		\$			1,500	
Production (shipments)— No. 1 Flake No. 2 Flake No. 3 Flake and Dust	95 103 1,162	22, 100 14, 853 63, 268	196 225 1,769	40,382 28,572 96,663		29,187 36,675
	1,360	100, 221	2,190	165,617	937	65,862
Imports— Crucibles, plumbago Plumbago not ground or otherwise		(a) 36,717		90,092		23,786
manufactured. Plumbago ground and manufactures of,						4,141
Exports— Graphite or plumbago, crude or refined	1,003	72,917		159,817	614	40,809

<sup>(</sup>a) Nine months only.

Artificial Graphite.—Artificial graphite is manufactured in electric furnaces at Niagara Falls, Ontario, by the Acheson Graphite Company. The annual production over a period of fifteen years is shown in the following table:

## Artificial Graphite Made in Canada, 1907-1921

TABLE 137

Calendar Year	Pounds	Calendar Year	Pounds	Calendar Year	Pounds
1907	428,540 513,436 2,442,166	1912 1913 1914 1915 1916	2,184,472 1,234,239 497,271	1917. 1918. 1919. 1920. 1921.	1,808,698 358,524

#### **GYPSUM**

The output of gypsum rock during 1921 was 434,545 tons as against 460,020 tons in 1920. By provinces, the quantity quarried was: Nova Scotia, 241,657 tons; New Brunswick, 62,021 tons; Ontario, 82,057 tons; Manitoba, 48,770 tons; and British Columbia, 40 tons. Of this quantity 121,878 tons, or 28 per cent, was calcined during the period. Shipments of all grades amounted to 386,550 tons, valued at \$1,785,538, while sales reported for the previous year were 429,144 tons, at \$1,893,991. Average values, per ton for the different grades were as follows: lump, \$1.78; crushed, \$2.56; fine ground, \$3.42; and calcined, \$10.61.

Importations of crude, ground and calcined gypsum during the year totalled 5,628 tons, valued at \$76,055. Exports during the same period amounted to 234,520 tons, consisting of 230,011 tons crude, and 4,509 tons of ground gypsum, with a total value of \$497,741.

Summary of Statistics on Gypsum in Canada, 1919, 1920 and 1921
TABLE 138

	19	19	19	20	19.	21
	Tons	Value	Tons	Value	Tons	Value
Ore, mined Ore, calcined	303,998 121,496		460,020 148,864	\$	434,545 121,878	\$
Production: by grades— Lump	172,781 27,939 3,842 94,501	206,858 68,002 18,901 921,526	48,379 6,615	457,158 146,947 46,584 1,243,302	195, 456 66, 893 7, 020 117, 181	347, 186 171, 567 24,029 1, 242, 762
	<b>2</b> 99,063	1,215,287	,429,144	1,893,991	386,550	1,785,538
Production: by Provinces— Nova Scotia New Brunswick. Ontario. Manitoba British Columbia.	163,852 42,409 59,899 32,903	250, 174 315, 656 278, 120 371, 337		573,752 428,183 404,162 487,894	206, 831 54, 030 84, 790 40, 859 40	511,883 360,220 433,053 480,282
Exports— CrudeGround	148,394	199,857 140,235	244,428 12,576	413,522 232,736	230,011 4,509	417,509 80,239
		340,092		646, 258	234,520	497,741
Imports— ( rude	1,238 85 1,525	22,556 2,695 22,204	2,294 118 2,822	25,477 3,966 48,859	2,952 41 2,635	31,303 2,427 42,325
	2,848	47,455	5,234	78,302	5,628	76,055

#### IRON OXIDES

Shipments of iron oxides during 1921 amounted to 9,048 tons, valued at \$93,610, as against 19,128 tons worth \$157,909 in the previous year. The sales comprised 6,969 tons crude and 2,079 tons ground and calcined. The average value of the former was \$2.99 per ton, while the latter sold for \$35 a ton.

In addition to the usual production of oxides from the bog iron ore deposits in the province of Quebec, a trial shipment was made to the United States by a small operator in British Columbia.

The crude oxide was used for the purification of illuminating gas and the calcined product was consumed entirely in the paint industry.

53150 - 7

## Production, Imports and Exports of Iron Oxides, 1919, 1920 and 1921

	1919		192	0	1921		
	Tons	Value	Tons	Value	Tons	Value	
Production	11,862	\$ 113,427	19,128	\$ 157,909	9,048	\$ 93,610	
Imports— Ochrey earths. Oxides. Exports (a).	1,297 3,378 767	65,744 518,780 25,229	3,231 3,567 1,528	182,997 619,923 78,913	1,217 2,191 1,491	61,576 346,070 66,631	

<sup>(</sup>a) Mineral pigments, iron oxides and ochres.

### MAGNESIUM SULPHATE

The production of magnesium sulphate or crude epsom salts in Canada during 1921 amounted to 2,029 tons, valued at \$39,506, comprising 1,412 tons crude and 617 tons refined. Shipments for the same period of 1920 were 1,947 The total quantity extracted during the year was 1,428 tons, worth \$39,886.

tons, as against 2.056 tons in the previous twelve months.

Preliminary shipments were made in 1920 by the Basque Chemical Production Company, Limited, from several lakes, containing these salts, on the Basque ranch, near Ashcroft, B.C. This company continued operations during 1921, extracting and refining a considerable quantity. The Stewart-Calvert Company Inc. of Oroville, Washington, did not make any shipments of magnesium sulphate from their deposits in British Columbia. In the previous year this firm made some shipments from its property near Clinton, Lillooet, B.C.

The crude magnesium sulphate was sold for use principally in the tanning industry, although the textile industries used considerable quantities, and the manufacturers of dyes also purchased small quantities. A small amount of the C. P. product was also sold to local dealers. The value of the products shipped varied according to the grades, that sold to the tanning industry being quoted at \$28 per ton, while the C. P. product was listed at \$94.60 per ton. some of the product was sold locally, shipments were also made to points in the United States and as far east in Canada as Ontario and Quebec.

### Production, Imports and Exports of Magnesium Sulphate, 1919, 1920 and 1921 TABLE 140

19	19
Tons	Value

1920 192	21
Tons   Value Tons	Value
\$ 1,947 39,886 { 1,412 617 72,709	\$ 18,425 21,081 29,987 4,562
	72,709 3,737 120

#### MAGNESITE

Magnesite was another industry in which there was a great decline in production during 1921. While shipments in 1920 amounted to 18,378 tons, valued at \$512,756, the quantity marketed during 1921 was only 3,730 tons, having a total valuation of \$81,320.

The average value obtained per ton of magnesite sold, by grades, was: crude, \$8.98; calcined, \$25.15; and dead-burned, \$35.75. During 1920, the prevailing prices were, crude, \$9.26; calcined, \$20.42; and dead-burned, \$37.40.

As in previous years, the bulk of the production of magnesite came from deposits in Argenteuil county, Quebec. One firm in British Columbia reported sales amounting to nearly 1,000 tons for the year. The North American Magnesite Producers, Limited, the Scottish Canadian Magnesite Company, Limited, and the International Magnesite Company, Limited, were as usual the only Quebec producers.

Dead-burned magnesite is consumed entirely in the metallurgical industry as a refractory lining for furnaces. Calcined magnesite is used as a plastic material for floors and walls in buildings and also in the manufacture of pipe

and furnace coverings.

Quebec magnesite has been used principally in the clinkered form by steel works, but owing to the depression in this industry the demand has been slight. Under the name of "Firestone Stucco," calcined magnesite has been introduced as a building material. Development work has been carried on and some shipments of the finished product have been made.

The following table shows the production, imports and exports of magnesite

during the past three years.

Production, Imports and Exports of Magnesite, 1919, 1920 and 1921

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
Crude, mined		8	31,040 30,230	8	1 010	\$
Production— Crude	1,638 9,635	14,664 313,801	3, 154	39,779 64,402 408,575	1,673 684 1,373	15 024 17 200 49,096
	11.273	328, 465	18,378	512,756	3,730	81,320
Imports— Magnesin Magnesite Magnesite firebrick  Exports—	183 (a) 886	61,740 21,734 120,189	1,521	84,339 49,799 446,445	220 185	87,530 8,000 61,728
Crude	100	425,892	10,859	1,662 425,048	1,351	63,603

<sup>(</sup>a) Last nine months.

#### MANGANESE

The entire Canadian production of manganese ore during 1921 came from the deposits at New Ross, Lunenburg County, Nova Scotia. The total shipments reported were 68 tons valued at \$3,400, as against 649 tons worth \$11,029 for 1920. No operations were carried on either at the deposits near Kaslo, B.C., or at the Hill 60 group of claims near Cowichan Lake, Vancouver Island. In former years shipments were made from these properties to the Bilrowe Alloys Company of Tacoma, Washington, U. S. A.

The manganese ores mined in Eastern Canada are pyrolusite, manganite, psilomelane and bog manganese. These are mostly ores with a high manganese

content and are fairly free from deleterious constituents.

53150 - 71

Manganese is used extensively by steel manufacturers, as it possesses the property of forming alloys with a large number of metals, producing a product of great tensile strength. Manganese compounds are also used extensively in the manufacture of chlorine, bromine, manganates and permanganates; as a decolourizer of glass, porcelain and enamels; as a colouring material in dyeing, pottery and paint manufacture; as a drier in paints and varnishes; and as a depolarizer in dry batteries.

The method used in determining the price of manganese by United States purchasers is quoted from the Engineering and Mining Journal-Press, as fol-

lows:

"The unit price is based on 100 per cent or 100 parts. In a long or gross ton there are 2,240 pounds, and there would then be 22.40 pounds to the unit. If the schedule ealls for a price of \$1 per unit, and the analysis shows 35 per cent manganese, the value of the ore would be \$35 per ton. Premiums would be added to this or penalties deducted from it. If, however, the ore was sold by the pound and the price was the same per unit, the price per pound would be 4.42 cents, or 100 divided by 22.40."

Production, Imports and Exports of Maganese Ore, 1919, 1920 and 1921 Table 142

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
		8		\$		\$
Production— Nova Scotia British Columbia	45 616	3,600 10,559	62 587	4,140 6,889	68	3,400
	188	14, 159	649	11,029	68	3,400
Imports— Manganese oxide	2,082	89,314	1,510	93,062	636	47,15
Ferro-silicon, spiegeleisen and ferro-mangan- ese	4,383	901,678	7,908	1,324,06!	2,294	295,420
Exports—  Manganese ore  Ferro-silieon and compounds	603	13,401 1,229,341	640 25,422	19, 921 1, 297, 720	28	2,246 504,842

#### MICA

Operations in the mica industry were considerably curtailed in 1921. Only some 1,173 tons were mined, of which quantity Quebec contributed 1,015 tons and the province of Ontario the balance, 158 tons.

Shipments of mica reported for same period amounted to approximately 702 tons, a decrease of 68 per cent, when compared with sales for the previous

twelve months.

It will be noted that the stated value of the exports of Canadian mica exceeded by a considerable amount the value placed on shipments reported by operators. An explanation of this lies in the fact that the exportations consisted principally of mica splittings, shipped from large trimming shops, situated in Ontario and Quebec, while most of the shipments by the mines were of mica in its rough-cobbed form.

The following table shows the shipments of mica by classes and the total value f.o.b. shipping point, together with the average price per pound.

### Mica Shipments by Grades in Canada, 1921

TABLE 143

Grade	Pounds	Value f. o. b. shipping point	Price per pound	
	\$		\$ cts	
Rough cubbed	329,010	31,920	-11	
Ground mica	20,000	15	-08	
Thumb-trimmed -				
1 × 1 inches	21,252	2,857	-1	
1 × 2 "	7,683	1,718	.2	
1 × 3 *	8,064	2,438	•3	
2 × 3 "	4,207	2,115	.5	
2 × 4 '	4,891	4,544	.9	
3 × 5 "	1,488	2,264	1.5	
4 × 6 "	655	1,240	1.8	
Splittings only	20,350	15,365	0.7	
Serap.,	986, 230	5,282	0.00	
Pattern	277	305	1.1	
Total	1,404,107	70,063	0.0	

## Production and Exports of Mica for Canada, 1919, 1920 and 1921 TABLE 144

	1919		1920		19	21
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		S
Production— Quebec Ontario.	2,429 325	218,437 55,351	737 1,486	281,460 94,562		41,172 28,891
	2,754	273,788	2,203	376,022	702	70,063
Exports— Mica, total. Cobbed. Splittings. Scrap and waste. Plate and manufactures.	(b) 350 (b) 2,182	214,227 314,238 11,950 596	522	8,474	185	12, 942 195, 479 12, 061 4, 201

<sup>(</sup>a) First 3 months. (Total Mica.)

(b) Last 9 months.

### MINERAL WATER

Mineral water produced in Canada during 1921 was valued at \$21,569, as compared with the total valuation of \$24,582 for 1920. Mineral springs in Ontario and Quebec contributed the total Canadian production.

In the present compilation, there has been included a record of all known shipments of natural mineral waters sold to the general public for medicinal purposes. No record has been kept of the shipments made of ordinary spring waters.

The values given do not take into account any mineral water used at the springs for drinking or bathing purposes but include only the shipments from the springs in bottles or other containers. The following table shows the production, imports and exports of mineral water over a period of three years:

## Production, Imports and Exports of Mineral Water, 1919, 1920 and 1921

	1919 Value	1920	192	I	
		Value Value		Imp. Gals.	Value
	8	8		\$	
Production, by provinces— Quebec Ontario British Columbia	13,257 55,958 1,800	10,109 14,473	19,620 308,647	7,278 14,438	
Total	71,015	24,582	328, 273	21,716	
ImportsExp rts	113,743 59,669			128,229 44,022	

### NATRO-ALUNITE

A small quantity of natro-alunite was mined during 1921 from a deposit located at Kyuquot Sound, on the west coast of Vancouver island, B.C. This ore was treated in the mill situated at Esquimalt, near Victoria, operated by the San Juan Mining and Manufacturing Company, Limited. The resultant product, calcined alunite, was used as a fertilizer, for its potash content Sales for the year amounted to 30 tens, valued at appreximately \$1,500.

#### NATURAL GAS

Natural gas produced in Canada during 1921, amounted to 14,077,601 thousand cubic feet. Ontario continued to be the leading producer of this commodity contributing 8,422,774 thousand cubic feet. The year's production showed a decrease of 2,767,917 thousand cubic feet or 16 per cent from the 1920 cutput.

While the value given in the following table for the output of natural gas in Ontario represents the sum of the values reported by the producers, the actual selling price of this gas to the consumers was at a considerably higher rate; the estimated retail value of the output was \$3,790,248, or an average of about 45 cents per M cu. ft. The retail price of natural gas in Ontario in 1921 ranged from 15 cents in the gas fields to 80 cents at the end of long transmission lines.

The Alberta production of 4,945,884 thousand cubic feet represented a decrease in quantity of some 687,558 thousand cubic feet or 12 per cent, but the value, \$1,374,599, showed an increase of \$193,254 or 16 per cent. In this province several large industrial concerns merely operated wells to supply their own demands, and in some instances therefore, a value for the product was not given, while in other cases only a nominal value was placed on the gas consumed. In order to obtain a value for this gas that would be comparable with the other records it was necessary to evaluate it at the average price paid by consumers throughout the province.

The production in the province of New Brunswick increased 26,241

thousand cubic feet or 3.8 per cent over the output for the previous year.

The following table shows the production of natural gas, by provinces, for the past three years.

## Production of Natural Gas in Canada, 1919, 1920 and 1921 Table 146

	1919		1920	)	1921		
	M. cu. ft.   Value		cu.ft.   Value M.cu.ft.   Value		M. cu. ft.	Value	
		8		\$		\$	
Production— New Brunswick Ontario Alberta Manitoba	682,896 11,024,041 8,230,838	120,510 2,690,400 1,365,127	682,502 10,529,374 5,633,442 200	$\begin{array}{c} 130,506 \\ 2,920,731 \\ 1,181,345 \\ 60 \end{array}$	708,743 8,422,774 4,945,884 200	139, 37 3, 080, 13 1, 374, 59 6	
Total	19,937,769	4,176,037	16,845,518	4, 232, 642	14.077.601	4,594,16	

### PEAT

The manufacture of peat in Canada was carried on during 1921 at the Alfred bog. Operations at this bog were of an experimental nature, conducted jointly by the Ontario and Federal Governments. During the year all efforts were concentrated towards the construction of a combination plant, which was expected to double the capacity of the former one.

The total quantity of peat produced during the year was 4,000 tons. Of this amount 1,666 tons valued at \$4 per ton was shipped. Practically the whole

of the remainder was lost in a fire which occurred at the plant.

### Production of Peat in Canada, 1919, 1920 and 1921

TABLE 147

	1919		19	20		1921
	Tons	Value	Tons	Value	Tons	Value
		\$		8		\$
Production	986	6,561	4,550	18,650	1,666	6,664

### PETROLEUM

Ontario, as usual, was the principal petroleum-producing province in Canada in 1921, the total output for the year amounting to 172,859 barrels valued at \$2.71 per barrel. The old Petrolia field showed a production of 68,484 barrels or 3,000 barrels in excess of the 1920 output. No new wells were drilled in this field during the year, and as the Petrolia field is now entering on its sixtieth year of production the increase was worthy of special mention.

The New Brunswick output amounted to 7,479 barrels valued at \$3.89

The New Brunswick output amounted to 7,479 barrels valued at \$3.89 per barrel. Activities in this province were confined to the Stony Creek district in Albert county, where operations were carried on by the New Brunswick

Gas and Oilfields, Limited.

The production in Alberta declined to 7,203 barrels or 3,829 barrels below the 1920 output, a drop of 35 per cent in quantity and value. The entire output was derived from the Turner Valley field, near Black Diamond.

In the Fort Norman area, Northwest Territories, drilling operations were continued during the year. Well No. 2, situated forty miles below Fort Norman, was reported as producing approximately 60 barrels per day.

Under the "Petroleum Bounty Act," Canadian producers continued to be paid a bounty of  $1\frac{1}{2}$  cents per gallon on all oil marketed of a specific gravity above 0-8235. The administration of this act is under the supervision of the Department of Trade and Commerce. Owing to the light character of the crude petroleum produced in Alberta, the greater part of the output in this province does not earn the bounty.

For comparative purposes, tables are given below showing production,

imports and exports of petroleum over a period of three years.

# Crude Petroleum Production in Canada, by Provinces, 1919, 1920 and 1921

A THIRD A A O						
	1919		1920		1921	
dilinenanti	Barrels	Value	Barrels	Value	Barrels	Value
		8		8		8
Bounty paid		119,714		97,700		94,677
Production: New Brunswick	4,225		5, 148 180 071			33,022 559 198

97,841

736,324

11,032

196,251

75,986

822, 235

187,541

49,313

16,437

240,466

## Crude Petroleum Production by Fields in Ontario,\* 1921

11	'A	B	Ł	E	1	45	j
-		-					

Alberta

Total.....

Field	Quantity in Barrels	Value less Bounty	Bounty Paid	Total Value
		\$ ets.	\$ ets.	\$ cts
Petrolia and Enniskillen Oil Springs Moore Township Sarnia Township Plympton Township	68,483,32/35 40,966 22/35 7,536 4/35 4,068 20/35 480 21/35	185,591 40 111,019 57 20,422 86 11,025 82 1,302 43	21,507 31 3,956 47 2,135 96	221,545 4 132,526 8 24,379 3 13,161 7 1,554 7
Bothwell. Filbury East. Vest Dover. Raleigh Township. Outton.	26,877 1/35 1,002 20/35 7,473 10/35 3,320 13/35	72,836 75 2,716 96 20,252 62 8,998 21	14, 110 46 526 35 3, 923 46 1,743 20	86,947 2 3,243 3 24,176 0 10,741 4
Jordaga Jelle River Joza Township Chamesville		1,534 32 29,170 69 3,576 03	5,651 16	
Total	172,858 32/35	468,447 66	90,750 78	559,198

<sup>\*</sup>Supplied by the Supervisor of Crude Petroleum Bounties, Petrolia, Ont.

Petroleum Refinery Statistics.—As a matter of interest there has been tabulated a record of the crude petroleum and other materials used in the oil refineries of Canada during the past two years and a list showing the quantities and values of the refined products made.

## Materials Used and Products Made by the Oil Refineries of Canada, 1920-1921

TABLE 150

	19:	20	192	21
	Quantity	Value	Quantity	Value
Materials used Crude oil, product of Canadian wells. Imp. gals. Crude oil, imported	6,711,070 288,865,457 48,001,510 66,666 2,738,824 204,423 251,065	716, 344	5,899,881 366,122,361 57,839,800 102,540 3,563,907 360,758 223,432	\$ 503,71- 32,794,451 674,851 3,161 167,556 34,19 3,122 673,030
Products made Gasoline Petroleum spirits Kerosene Fuel and gas oils Lubricating oils Grease Tar Petroleum coke Wax and candles Other products  Total	86, 193, 664 2, 447, 489 54, 155, 655 96, 462, 792 17, 192, 398 7, 695, 701 14, 424, 634 33, 576 10, 398, 127	545,174 94,073 297,400 973,805 1,256,014	2,037,319 59,018,153 129,114,124 17,345,119 6,674,262 18,971,400 65,395	30,806,35 420,99 7,520,22 6,551,05 3,852,05 1269,27 142,28 621,91 310,26 757,69

### Imports into Canada, and Exports of Petroleum and its Products, 1919, 1920 and 1921

TABLE 151

	1919		1920		1921	
mports Crude petroleum in its natural state, .7900 specific gravity or heavier at 60 degrees	Gals,	\$	Gals.	\$	Gals.	
temperature, when imported by oil refiners to be refined in their own factories. Crude petrolcum, gas oils other than naphtha, benzine and gasoline lighter than *235 but	305, 748, 960	15, 104, 287	290,736,366	20,814,899	355,300,352	20,010,0
not less than 775 specific gravity at 60 degrees.  Petroleum (not including crude petroleum imported to be refined, or illuminating or	155, 145	23,866	178, 641	28,869	222,241	18,7
lubricating oils) -8235 specific gravity or heavier at 60 degrees tomperature	99, 559, 068	4,702,771	122,750,650	7, 790, 137	61,176,430	3,796,9
Concentrating establishments	42,085	1, 367	16,249	1,344	18,022	3,5
Coal oil and kerosene, distilled, purified or re- fined.  Huminating oils, composed wholly or in part of the products of petroleum, coal, shale or	6,757,159	926,821	14,971,509	2,359,621	10,544,281	790,
lignite, costing more than 30 cents per gullon	156, 126	119,465	176,340	127, 880	120,416	62,
LUBRICATING OILS						
ubricating oils, composed wholly or in part of petroleum, and costing less than 25 cents per gallon ubricating oils, n.o.p.	1,496,809 3,480,183	289,442 1,467,593	881,102 4,376,192	175,478 2,267,611	2,032,361 3,008,095	374,! 1,559,9
OTHER OILS						
Gasoline under ·725 specific gravity at 60 degrees temperature	4,391,607	1,142,855	8,515.545	2,404.488	21,101,146 19,163,561	4,665,1 2,946,1
All other oils, n.o.p.	268,604	128,863	222,041	113,681	57,667	39,
OTHER PRODUCTS OF PETROLEUM						
Grease, axle Lb.  Paraffine wax "  Paraffine wax candles "  Paraffine wat candles to the control of the control	3,927,278 844,838 541,626	357,495 108,049 111,707	8,408,394 2,425,959 538,285	803,848 276,772 124,764	3,289,526 1,362,188 201,906	296. 72. 45,
leum for toilet, medicinal or other purposes etroleum, products of, n.o.p	29,516,589	327,715 5,615,622	48, 769, 546	386, 127 10, 891, 302	13,113,087	219, 1,990,
Cotal Petroleum and its Products, Imported		30, 427, 918		48,566,830		36,892,
Exports						
Oil, coal and kerosene, crude	603,748 2,846,293 1,566,777	40,648 287,170 428,754	2,684,427 1,243,335 160,433	203,325 205,999 59,432	5,384,751 1,466,422 762,080	375, 209, 212,
Oil, mineral, n.o.p	71,259	626,799	26,915	230, 172	105,499 821	31.
Total Petroleum and its Products, Exported.		1.383.371		788, 928		836.

### PHOSPHATE

The output of phosphate in Canada during 1921 was only 70 tons produced as a by-product in the mining of mica in the province of Quebec. Of this quantity 30 tons valued at \$450 was sold locally.

The value of phosphate rock imported, principally Florida phosphate, showed a considerable decrease, to an average of \$6.30 per ton, as against \$8.50 a ton for 1920 importations. The total tonnage imported was practically unchanged.

## Production, Imports and Exports of Phosphate, 1919, 1920 and 1921

TABLE 152

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
		\$		\$		- 5
roduction—	22	300			30	4.50
Quebec Ontario	2	31				
	24	331			30	45
mports— I'hosphate rock		30,267	13,476	114,480	13,711	86, 53
Acid phosphate (a)	1,423	295,387		369, 105	1.545	253,64
Phosphorus	24	19,928		49,699	25	24,38
Phosphor tin and bronze	62	61.647		120,720	105	103,80
Superphosphate		(b) 178, 292		470,970		484, 36
Exports-Phosphate rock	48	741		645		

(a) Probably refined phosphate of lime and phosphate of soda.

(b) Separately classified as from April 1, 1919; formerly included under manufactured fertilizers.

### PYRITES

The production of pyrites (iron and copper) in Canada during 1921 decreased considerably from the quantity produced in 1920. By provinces, shipments for the year were: Quebec, 1,986 tons; Ontario, 27,785 tons; British

Columbia, 3,597 tons; making a total of 33,368 tons for the Dominion.

The total sulphur content of the 1921 production was 12,213 tons; the percentage of sulphur varied from 33.6 per cent to 38 per cent, with an average

of 36.6 per cent.

Small shipments of copper-pyritic ore were made from the Weedon mine in the Eastern Townships of Quebec. The producing companies in Ontario were: The Algoma Steel Corporation, Limited; Nichols Chemical Company, Limited (Sulphide and Northpines mines), and the Grasselli Chemical Company. The latter company made a small shipment from stock. The British Columbia producers were: the Consolidated Mining and Smelting Company of Canada Limited, and the Granby Consolidated Mining, Smelting and Power Company. The former company shipped from the Sullivan mine to the acid plant at Trail, and the latter firm's shipments were from the Hidden Creek mine at Anyox to the plant at Barnet, B.C.

## Production, Imports and Exports of Pyrites, 1919, 1920 and 1921

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
		8		\$		\$
Production— Quebec Ontario British Columbia.	52,746 117,011 6,730	203, 222 285, 832 33, 650	14,817 148,652 11,275	44,451 618,283 56,376	1,986 27,785 3,597	10,463 101,306 4,557
	176,487	522,704	174,744	719,110	33,368	116,326
Sulphur content	65,674		67,608		12,213	
Brimstone or sulphur, crude or in roll or flour	56,062 89,089	1,015,223 388,508	144,733 119,136	2,113,713 458,403	78,762 7,875	1,272,619 31,500

Sulphuric Acid.—Eight firms manufactured sulphuric acid in Canada during 1921. a similar number as reported operations in the previous year.

Statistics have been collected giving the production of this commodity in terms of the standard grades of 50° Bé., 60° Bé and 66° Bé. For comparative purposes it has been deemed advisable to reduce the first two grades to their equivalent in 66° Bé., acid.

Production,\* Imports and Exports of Sulphuric Acid, 1919, 1920 and 1921

Table 154

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
Ore used— Sulphur. Pyrites. Production. Imports. Exports.	54,879 63,596		44,398		55,902 94	237, 460 143, 778 1, 290, 785 10, 653 55, 775

<sup>\*</sup>Expressed in terms of 66° Bé acid. Record includes a small production of oleum and other grades, the strength of which is not specified. An approximate estimate of production in terms of 50° acid will be obtained by increasing these figures by 50 per cent.

### QUARTZ

Shipments of quartz (silica) during 1921 amounted to 100,350 tons valued at \$312,947, as compared with 128,295 tons, worth \$467,821, for the previous year. Sales for the period comprised 68,390 tons of crude at \$2.78 per ton and 31,960 tons crushed product at \$3.88 a ton. The total quantity quarried during the year was 97,260 tons and the stock on hand at the end of the twelve months was 3,645 tons.

The quartz grinding plant at St. Canut, Quebec, owned by the Silico Limited, formerly the Cascades Silica Products Co., was operated throughout the

vear.

The principal companies operating during 1921, were Dominion Mines and Quarries, Limited; Granby Consolidated Mining, Smelting and Power Co., Limited; International Nickel Company of Canada, Limited; Mond Nickel Co., Limited, and Wright and Company.

Quartz is used in the smelting of nickel and copper ores, in the manufacture of ferro-silicon, glass, sanitary ware, silica brick, paints, scouring soaps,

and abrasives.

Production and Imports of Quartz, 1919, 1920 and 1921
Table 155

	1919		1920		1921	
	Tons	Value	Tons	Value	Tons	Value
Production—		\$		\$		\$
Quebec. Ontario. British Columbia.	2,221 60,055 32,715	7,773 179,549 340,313	1,986 90,433 35,876	5,558 321,063 141,200	5,994 72,068 22,288	29,824 220,806 62,317
	94,991	527,635	128, 295	467,821	100,350	312,947
Imports— Silex Flint	641 5,411	13,825 100,902	1,154 9,047	26,097 170,355	1,211 5,061	36,041 84,761

#### SALT

Twelve firms reported production in the salt industry during 1921, ten of these being in Ontario, one in Nova Scotia, and one in Saskatchewan. The number of firms engaged in this industry under normal conditions is sixteen.

The total output for the year amounted to 172,627 tons, of which quantity approximately 95 per cent, or 164,658 tons, valued at \$1,673,685, was sold. While the quantity sold in 1921 was 45,197 tons less than in the previous year, the value received showed an increase of \$128,961.

Southern Ontario continued to be the chief producer in the salt industry,

contributing 98 per cent of the total output.

The Senlac Salt Company operating for five months of the year near Senlac, Saskatchewan, produced slightly less than one thousand dollars worth of common coarse salt. The open pan system of evaporation was used by this company.

The Malagash Mine in Nova Scotia was in operation throughout the entire year, and produced a considerable quantity of common coarse salt. In addition to this, small quantities of table and dairy salt, rock salt and land salt were mined and sold. The last named grade was found to contain potash and was used to some extent as a fertilizer.

Summary statistics relating to the salt industry in Canada are given in the

following table:-

TABLE 156

#### Production of Salt in Canada, 1921

	Quantity Manu- factured	Quantity Sold	Value of Salt Sold (Not including packages)	Stocks on hand at end of year
Table and dairy. Common fine. Common coarse Land salt Other grades Brine for chemical works (Salt equivalent sold or used).	Tons 40,992 41,398 33,442 3,246 3,017	Tons 40,961 36,074 30,905 3,197 2,989 50,532	455, 204 327, 279 39, 071 27, 713	
Total	172,627	164,658	1,673,685	10,639

#### Consumption of Salt in Canada, 1919, 1920 and 1921

TABLE 157

	1	919	1	920	1	921
	Tons	Value	Tons	Value	Tons	Value
Production— Table and dairy	47,571 64,426	\$	39,700 122,626	8	40,961 36,074 84,426 3,197	\$ 755,721 455,204 423,689 39,071
Total	148,301	1,397,929	209,855	1,544,724	164,658	1,673.685
Value packages	2,974	573,795	5,481	753,763	10,639	661,631
Exports	617	14,573	303	9, 181	348	7,584
Imports— Fine, in bulk <sup>1</sup> In bags, barrels <sup>2</sup> . All other <sup>3</sup> .	33,173 62,292	467, 581 553, 439	33,615 67,693	446,671 631,627	33,531 50,515	
Total imports	147,406	1,310,129	155,646	1,434,687	129,723	1,025,268
Consumption of salt4	295,090	2,693,485	365,798	2,970,230	294,033	2,691,369

Duty 5 cents per 100 pounds; 2Duty 7½ cents per 100 pounds; 2Free—Imported for use of sea or guiffisheries. Sum of production and imports, less exports.

#### SODIUM CARBONATE

The Lillooet Soda Company, Limited, shipped some 197 tons of sodium carbonate crystals during 1921. These shipments were made from a deposit located near Clinton, Lillooet District, British Columbia. The production of soda ash from salt brine is now carried on in Canada on a very large scale.

This material is used in the manufacture of glass, soap and paper, for bleaching and washing linen, cotton, wool, etc.; dyeing and printing fabrics; preventing the formation of boiler scale and also as a reagent in analytical chemistry.

#### SODIUM SULPHATE

Sodium sulphate is produced in Canada from natural deposits in the province of Saskatchewan. One of these is located near Hardy, Saskatchewan, and is operated by the Sodium Sulphate Company of Saskatchewan, Limited; the other, situated at Maskakee Lake, near Dana, Sask., is worked by the Salts and Chemicals, Limited, of Kitchener, Ontario.

The total quantity of natural sodium sulphate sold during 1921 amounted to 624 tons, comprising 112 tons crude, averaging \$16.29 per ton and 512 tons refined or glauber's salt at \$33.25 a ton. Sales for the same period of 1920 were slightly higher, totalling 811 tons worth \$19.496.

### Production and Imports of Sodium Sulphate, 1919, 1920 and 1921

ps.				E.	-0	pe	0	
	Δ	ы	т	160		530	34.	

	19	)19	19	920	19	21
	Tons	Value	Tons	Value	Tons	Value
P oduction—		\$		\$		\$
Natural Sodium Sulphate— Crude	15	450	811	19,496	{ 112 512	1,824 17,020
Artificial Sodium Sulphate— Sodium sulphate	4,153	73,240	5, 524	111,983	2,418	54,804
Glauber's salt	1,417	45,731	1,781	50,330	1,239	42,719
mports— Soda, sulphate of, crude, known as salt cake.	23,953	343,007	42,974	958,628	27,654	690,311

#### TALC

The total quantity of tale mined in Canada during 1921 was 10,150 tons, of which 10,134 tons was ground. Sales of crude and ground tale reported for the year totalled 10,134 tons, valued at \$14.27 per ton, as against 19,610 tous, with an average value of \$15.49, in 1920. By grades, the average price obtained per ton was: high, \$22; medium, \$14; and low, \$8, while the crude product sold for \$4 a ton.

The Henderson Mines Limited, and the Asbestos Pulp Company, Limited, (formerly the Anglo-American Tale Corporation) were the only Ontario producers in 1921. The output of the former company was milled in the plant operated by the Messrs. Geo. H. Gillespie and Company, Limited, of Madoc. The British Columbia production was derived from a tale deposit operated by the

Eagle Tale and Mining Company in the Victoria Mining Division.

### Production in Canada and Exports of Talc, 1919, 1920 and 1921

- 1	Α.		E	4.0	U C

	19	19	19	20	1921	
	Tons	Value	Tons	Value	Tons	Value
		8		8		\$
Production— Crude Refined	12,243 6,399	49,074 67,221	11,820 9,851	48,939 117,995	10, 134	144,56
Total	18,642	116,295	21,671	166,934	10, 134	144,56
Exports		210, 150		263,708	7,115	112,72

### STRUCTURAL MATERIALS AND CLAY PRODUCTS

During the year 1921, in common with all other industries, the production of structural materials and clay products in Canada suffered a general decline. To a considerable extent, this loss was due to the high prices of materials and the consequent slowing down of building and construction activities, and to a

less extent, to labour difficulties in the building trades.

For the purposes of statistical compilation, structural materials and clay products have been divided into the following classes: cement, clay products, lime, sand and gravel, slate, and stone; clay products was further separated into smaller groups. Compared with 1920, even though the average prices of the different commodities for 1921 did not drop much below those of 1920, there was a considerable falling off not only in the number of active plants but also in the yearly production. The production of the principal commodities in the two years was as follows, those for 1920 being shown in brackets: cement, 5,752,885 barrels (6,651,980 barrels); lime, 6,879,066 bushels (9,427,334 bushels); sand and gravel, 11,574,862 tons (11,530,795 tons) and the value of clay products \$8,857,818, (\$10,664,929); and stone \$6,343,696, (\$7,580,351). While the data refer to Canada as a whole, the conditions in each province showed much the same trend.

In the following table, summary statistics covering production, imports, exports and consumption are presented. Decreases were shown in nearly every item. The apparent increase in the consumption of cement in 1921 was largely due to the decline in exports which during this year were about \$1,500,000 below

those for 1920. The table follows:-

Summary Statistics of Structural Materials and Clay Products, 1919, 1920 and 1921

	Production	Imports	Exports	Con- sumption
	8	8	8	8
Cement, Portland and puzzolan			465,954	9,400,922
192			2, 193, 626	12,735,363
192			650,658	13,627,100
Clay and clay products 191			164, 254	13,011,440
192			358, 151	19,721,561
192			245, 835	
Lime			128,810	
192			381,899	
192			247, 112	
Sand-lime brick*				484,854
192				724,918
Sand 11		000 400	191 740	0 740 740
Sand and gravel			131,140	
192		267,950	193,503	4,365,514
Slate			201,711	2,450,113 153,830
192				273, 373
192				289, 924
Stone		960, 925	54, 115	5, 132, 747
192		1,217,216	102,988	8,694,579
192		927.694	57, 924	7.213.466
102	0,040,050	- 100 T	01,023	-,270,300
Total	27,421,510	6,691,291	944, 273	33, 168, 528
192		11,338,831	3, 230, 167	50,000,752
192		8,929,217	1,403,240	42,263,405

<sup>\*</sup>Not included under Mineral Production in 1921.

#### CEMENT

The decline in the production of cement in Canada in 1921 was not as noticeable as in some of the other building materials. The total output of Portland cement from Canadian mills amounted to 6,449,656 barrels and was valued at \$16,016,709. Sales during the year amounted to a total of 5,752,885 barrels having a selling value of \$14,195,143, as compared with 6,651,980 barrels valued at \$14,798,070 in the preceding year. The decline in output was only about 49,000 barrels, but the falling off in sales was in the neighbourhood of 900,000 barrels, the decline in the value of sales amounting to about \$600,000. Stocks on hand at the mills increased from nearly 1,000,000 barrels at the beginning of the year to 1,603,000 barrels at the end of the year.

The principal producing provinces were Ontario and Quebec, the sales of cement from the former province being valued at approximately \$6,424,000, while the value of the cement from mills in Quebec amounted to \$5,410,000. The cement manufactured in the province of Quebec amounted to 2,748,000

barrels, while Ontario produced 2,671,556 barrels.

Exports of eement during the year amounted to 848,208 cwt., equivalent to

242,345 barrels of 350 pounds each, valued at \$650,658.

Imports of cement and manufactures of eement were negligible, the total importations during the year amounting to only \$82,615.

Summary Statistics of Cement in Canada, in 1919, 1920 and 1921
Table 161

	19	19	19	20	1921		
O-max-tar	Barrels	Value	Barrels	Value	Barrels	Value	
		\$		\$		8	
Plants— Active—No, and capacity IDLE —No, and capacity	10-30,025		13—39,025 14		14—41,942 9		
Output— Marl Limestone	110,899 4,512,689		(b) 86, 171 6, 412, 379		(b) 10,676 6,438,980		
	4,613,588		6,498,550		6,449,656		
Sold or used			6,651,980 936,173				
Portland		13,129	32,963	18,453		75,676 6,948	
Exports	(a) 177,506 4,831,817	465,954	(a) 835,667 5,849,276	2, 193, 626	242,345 5,522,597	650,650	

<sup>(</sup>a) Quantity not recorded but estimated at the rate of 75 cents per cwt. or \$2.6214 per barrel.

(b) Including puzzolan.

#### CLAY AND CLAY PRODUCTS

The production of clay products covered brick of various kinds, such as common and pressed, ornamental and fancy building bricks, firebrick, siliea brick and also sewer pipe, tile and pottery. There was also included elays, such as fireclay and kaolin or china clay.

The total value of elay products sold in 1921 was \$8,857,818, as against \$10,664,929 in 1920 and \$7,906,366 in 1919. The decrease for 1921 amounted to 16.9 per cent in value. In the following table a summary of statistics

relating to this industry is shown for a period of three years.

53150-S

## Production, Imports and Exports of Clay and Clay Products, 1919, 1920 and 1921

	1	919	1	920	192	1
	Quantity	Value	Quantity	Value	Quantity	Value
	100	\$		S		8
anufactured— Common brick M	302, 278	.,,,,	347 016		218,753	3,558,5
Common brick			102,868		83, 165	
ocks Dec. 31—	01,110		202,000			
Common M	51,110		84,023			
Pressed M	18,458		28,668			
roduction (Sales)—						o #07
Common brick M	291,470			4,835,996		3,567, 1,738,
Pressed brick. M Fire proofing. Tons.	74,424 41,406	1,304,162 345,382	85,137 49,091	2,004,537 591,418		452,
Hollow building blocks M	1,985	76,673		302, 261		177.
Kaolin: Tons.	759	13,744	683	15,022		1,
Ornamental M	365	10,175	3,515	73,926		
Terra-cotta lumber		40,527				134, 231,
PotteryRefractories—		100,474		200,111		201,
FireclayTons.	4,600	24, 163	8,321	44,091	2,931	29,
Firebrick M	5,610	268,756	7,293	375,230		242.
Other productsTons.	2,946	96,435	PO 007	54,792		91,
Sewerpipe	62,821 20,078	1,074,146 616,510	58,887 14,527		J	473.
Tile, drain M	20,010		11,021			
		7,906,366		10,664,929		8,857,
n ports—						
Bath brick		1,135			4 000	1,
Building brick M	7,394	128,876	2,944	94.314	4,269	126, 120,
Building blocks		102,107		100,200		1200,
ChinaTons.	8,643	129,652	13,445	234,668	8,130	138,
Fire	30,777	185, 156	50,611	267, 180		148,
		922 46,420		2,804 145,988		72.
Other clays				5,744		5,
Drain and sewerpipe	.,	66,727		30,111		41,
Earthen and chinaware		2,925,295				5,023,
Firebrick (a)						630, 445,
Firebrick, n.o.p		120, 189				61,
Silica brick		(b)157,374		378,759		229,
Paving brick M	3,552	77,374		74,515		41,
Other clay manufactures		144,008	,	230, 995		162,
		5, 426, 702		9, 414, 783	115/014444	7,249,
ports—	4 770	50 050	8,073	115,627	2,136	29,
Building brick M	4,770	52,050	0,013	110,027	2,130	20,
Unmanufactured Cwt.	5,901	3,672	4,738	2,175	2,095	
Manufactures		84,953		196, 222	,,,,,,,,,,,,	80,
Earthenware		23,579		44,127		135,
		104 074	7	250 151		245.
		164, 254		398, 191		220,0

<sup>(</sup>a) Duty free, of a kind not made in Canada. (b) Last 9 months.

Brick, Common and Pressed—Over 50 per cent of the production of the industry under review consisted of common and pressed brick. In 1921 the total value of these two items amounted to \$5,305,796 as compared with a reported production in 1920 of \$6,840,533.

Clay Paving Brick—Paving brick was formerly made in Canada, chiefly at West Toronto, Ont., from shale obtained from the banks of the Humber river, and more recently, during the years 1915 and 1916, there was a small production reported from Clayburn, B.C. There was no production reported for the past four years. The annual production for a number of years varied from 3,000,000 to over 5,000,000 per season.

Drain Tile—The total sales of drain tile in Canada in 1921 were valued at \$473,952. The greater part of this production was from Ontario, the sales in this province being valued at \$397,104.

Kaolin—The shipments of kaolin in 1921 were 124 tons, valued at \$1,888, as compared with 683 tons, valued at \$15,022 in 1920.

The production was obtained from the deposits in the township of Amherst, Ottawa county, Quebec, operated by the Canadian China Clay Company of Toronto. The plant for refining the clay is situated two miles from St. Remi d'Amherst, and seven miles from Huberdeau, the terminus of the Montfort Branch of the Canadian National Railway, forty-six miles northwest of Montreal.

Pottery—Sanitary porcelain was made at St. Johns, Que., and electric porcelain at Hamilton and Peterborough, Ont. The raw materials, including clays, ground quartz and feldspar were all imported.

Stoneware pottery, such as crocks, jars, churns, and jardinieres, was made at Medicine Hat, Alta., from Saskatchewan clay; at Hamilton, Ont., from imported clays; and at St. John, N.B., partly from Nova Scotia clay.

Flower pots were made at a few localities from domestic red burning and tile clays.

Refractories—The total value of the sales of refractories amounted in 1921 to \$816,294. This production included: fireclay or refractory clay sold as such, \$29,851, firebrick valued at \$242,462, fireclay blocks and shapes valued at \$91,685 and fireproofing and hollow porous blocks to the value of \$452,296.

Sewerpipe—The total sales of sewerpipe in 1921 were valued at \$1,666,584. About 56 per cent of the value of the production was credited to Ontario.

# Production of Clay Products in Canada, by Provinces, 1921 TABLE 163

		Common	Pressed brick					
Province	Sold or used			No.manu-		old or used	1	
	No. manu- factured	Number	Value	Per M.	factured	Number	Value	Per M.
			8	\$			\$	\$
Nova Scotia New Brunswick. Quebec. Ontario Manitoba Saskatchewan. Alberta British Columbia Total	9,946,700 2,500,000 61,850,915 119,275,155 9,759,000 4,666,500 4,553,800 6,201,320	1,800,000 70,241,354 114,582,789 9,357,552 3,789,175 7,180,085	26,300 1,020,184 2,025,643 169,219 50,718 103,265 63,924	17.68 18.08 13.39 14.38 17.42	11,571,001 58,884,179 1,361,710 2,455,000 7,785,420 1,107,958	11,931,066 57,026,965 622,900 1,900,000 8,358,509 1,107,958 80,947,398	1,194,580 22,837 56,628 164,049 49,062	21 · 03 20 · 98 36 · 66 29 · 80 19 · 63 44 · 28

Province	Fire o		No. manu-	Fire brick	Fire clay blocks and shapes	Fire proofing and hollow porous blocks	
	Tons	Value	factured	Number	Value	Sold or used	Sold or used
		\$			\$	\$	\$
Nova Scotia	1,183	5,619 300	829,850	598,000	30,992	156	
Quebec Ontario	40 463	160 7,756	12,000 991,515	12,000 1,094,069	370 62,891		
Saskatchewan	199	1,532	410,000	304,000	12,469		
Alberta British Columbia	986	14,484	2,494,164	2,494,164	135,740	20,228	136,447
Total,	2,931	29,851	4,737,529	4,502,233	242,462	91,685	452,296

Province	Moulded	Moulded and ornamental brick			w building or blocks	Drain tile	Sewerpipe	
No.m	Sold or used		Sold o		r used	Sold	Sold	
	No.manu- factured	Number	Value	No.manu- factured	Number	Value	used	used
			\$			\$	\$	\$
Nova Scotia							3,702	213,042
New Brunswick		42,725	1,388	528,000	440,000	36.999	21.362	297,691
Ontario	2,200,230	1,877,759	46,795					939,463
Manitoba Saskatchewan				697,000 406,000				
Alberta	245,400	74,800	2,393		1,061,192	17,376	3,717	161,952 54,436
Total	2,456,520	1,995,284	50,576	4,517,114	3,627,777	177,273	473,952	1,666,584

Province	Architect- ural terra-cotta and tile other than drain	Pottery	Ка	olin	Tot	al	
	Sold or need	Sold or used	Sold o	r used	Sold or used	Per cent	
	SOIG OF MAGG	Sold or used	Tons Value		Solu or used	value	
	\$	\$		\$	\$		
Nova Scotia					361,761		
New Brunswick Quebec.		40,000	124	1.888	66,600 1,744,760		
Ontario	120,594	69,984			5,183,125	58-55	
Manitoba. Saskatchewan.					208,982 166,244	2-35 1-87	
Alberta British Columbia		121,278			710,477 415,869	8-02 4-69	
Total	134,193	231.262	124	1,888	8,857,818	100-00	

#### LIME

The production of quicklime during 1921 amounted to 5,965,381 bushels valued at \$2,345,469. In addition to this, a total of 31,979 tons of hydrated lime valued at \$435,728 was also made during the period. The total value of the lime produced during the year was therefore \$2,781,197 as compared with a valuation of \$3,818,553 for the 1920 production.

The decline in the production of lime was almost directly proportional to the decrease in the construction industries of Canada throughout the year. The average price obtained for quicklime remained in the neighbourhood of 40 cents per bushel, although there was the customary variation in the prices obtained in the several provinces of the Dominion. The average value of

hydrated lime was about \$14 a ton.

Ontario's production of lime during 1921 amounted to 3,530,547 bushels, valued at \$1,344,188, comprising 2,763,062 bushels of quicklime, valued at \$962,439, and 767,500 bushels of hydrated lime, worth \$381,749. Quebec was the next largest producer, contributing 2,040,451 bushels evaluated at \$790,503.

Scarcely any lime was imported into Canada during the year; the total value of imports amounted to \$19,512. More lime was exported, the Customs figures showing a total of \$247,112 as the value of exportations of this commodity during the period.

## Quantity and Value of Lime Sold or Used in 1921, showing Purpose for which Sold or Used

TABLE 164

	Sold or Used						
There are the sold on used	Quick	klime	Hydrated Lime				
Purpose for which sold or used	Bushels	Total sell- ing value at kiln	Tons	Total sell- ing value at kiln			
Building and whitewashing	1,237,158 971,387 313,827	\$ 480,665 313,721 95,196	26,069 746	\$ 380,042 8,448			
Paper mills, sulphite and soda pulp works	1,465,886 371,911	541,521 119,081	1,523	14,42			
Tanneries Agricultural uses (fertilizers). Dealers uses unspecified) Other purposes	35,845 75,477 801,415 692,475	11,299	1,814 1,526 300	12,819 16,579 3,400			
Total sold or used	5,965,381	2,345,469	31,979	435,72			

#### Imports and Exports of Lime, 1919, 1920 and 1921

	191	9	192	0	1921	
	Tons	Value	Tons	Value	Tons	Value
Imports		\$ 53,190 128,810	2,739 23,016	\$ 48,790 381,899	1,211 12,722	\$ 19,512 247,112

Output and Sales of Lime in Canada, by Provinces, 1919\*, 1920\* and 1921
TABLE 166

		0 1 111		TY 1			То	
		Quicklime			rated Lime	9	10	tai
	Quantity made	Sold o	r used	Quantity made Sold or		r used	Sold o	r used
	Bushels	Bushels	Selling value at kiln	Bushels	Bushels	Selling value at kiln	Bushels	Selling value at kiln
			8			\$		\$
19							366,543 201,500 25,914	73,309 40,300 6,085
19	20						468,533 701,859 562,447	223,193 365,030 203,084
	20				99,857		1,796,822 2,108,203 2,040,451	493,762 826.044 790.503
	20				767,485		3,578,834 5,109,635 3,530,547	1,962,086
	019 020 021 413,283						476,452 605,399 413,283	147,131 210,984 136,375
19	019 020 021 107,083						109,067 139,433 107,083	41,276 72,477 48,332
19	019 020 021 175,183	152,998					351,253 561,305 199,341	187,963 341,632 252,630
	919 920 921 5,993,361	8,410,334			1,017,000	481,286		

<sup>\*</sup>Separate statistics not available for Quicklime and Hydrated Lime, by Provinces in 1919 and 1920.

#### SAND AND GRAVEL

Sand and gravel was produced in all provinces of Canada. The different grades, quantities and values of the production during 1919, 1920 and 1921 were as follows:—

Total Production of Sand and Gravel in Canada, 1919, 1920 and 1921

TABLE 167							
77. 1	19	19	19	20	1921		
Kind	Tons	Value	Tons	Value	Tons	Value	
Sand	200,830	1,373,704 71,249 26,883 2,680,460	2,103,418 7,940,700 44,353 66,512 11,530,795 219,398	1,354,912 1,883,833 59,271 57,944 4,201,067 267,950	2,635,957 70,215 6,971,874 91,080 (a) 135 (b) 49,915 11,574,862 165,489		

<sup>(</sup>a) Glass sand. (b) Other sand including blast, core and engine sands.

While sand and gravel for railway ballast amounted to over sixty per cent of the total, the material used in building and construction, and in concrete was important, amounting to about 38 per cent. Although most of the sand and gravel produced by the railways was used in the form of ballast for the roadbeds, there were other grades produced in less important quantities

#### Railway Production of Sand and Gravel in Canada, 1921

Танья 168

Kind	Tons	Value
Moulding sand Duilding sand and sand for operate road-work Other sand finelading blast, core and engine sands) Sand and gravel for ballast Sand and gravel for concrete, road-building, etc.  Total	240 31,911 34,829 6,847,223 782,663 7,696,866	\$ 780 6,270 9,416 938,643 188,816

Of the other producers of these commodities there were 218 in Canada as follows: Nova Scotia, 11; New Brunswick, 2; Quebec, 11; Ontario, 171; Manitoba, 8; Saskatchewan, 6; Alberta, 4; British Columbia, 5.

The small amounts used in the Yukon were not important relating only to local construction of foundations, etc. The total production by the above operators is shown below.

#### Production of Sand and Gravel by Other Operators in Canada, 1921

Tamin 169

K54i	Tons	Value
Ohess exact  Moulding sand Building sand and sand for concrete road-work, etc Other sand (including blast, core and engine sands) Sand and gravel for railway ballast Sand and gravel for concrete, road building, etc. Tushed gravel  Total	91,440 1,723,175 15,086 124,651 1,853,294 70,215 3,877,996	\$ 10 69,47 590,71 13,63 42,63 613,31 63,45

#### 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 on manufactured products, only a few notes are here included. The number of sand-lime bricks produced during 1921 was 43,457,036, having a total value of \$662,744. In 1920 the total number made was 48,926,000, of which 45,459,022, valued at \$724,918, were sold or used. The decline in production was, therefore, in the neighbourhood of 5,000,000 bricks and the falling-off in value of production amounted to about \$60,000.

Four-fifths of the production of sand-lime brick was credited to Ontario, the value of the production in this province amounting to \$534,531. Manitoba ranked second with a production of 6,403,000 bricks, valued at \$116,926. A small production was reported from Alberta, the quantity made being 572,500, the total selling value of which was \$11,287.

The number of plants operated for the production of sand-lime brick in 1921 was ten. Of these plants, seven were located in Ontario, two in Manitoba, and one in Saskatchewan.

#### SLATE

The entire production of Canadian slate comes from deposits situated along the south shore of the St. Lawrence river in the Province of Quebec. Mining of slate has been carried on in this province since about 1854, the maximum production occurring in the year 1889 and amounting to 695 tons of roofing slate valued at \$119,160. During 1921 the production amounted to 415 squares of roofing slate, valued at \$4,063, and 2,232 tons of crushed slate, valued at \$18,262. The 1921 production of roofing squares as indicated in the table below was a little better than 25 per cent of the figure for 1920. Imports of roofing and other kinds of slate also fell below the figures for the previous year. There were no exports of this commodity.

Production and Imports of Slate, 1919, 1920 and 1921
TABLE 170

	191	9	1920	0 .	1921	
	Squares	quares   Value		Squares   Value		Value
		\$		8		\$
Production	1,632	10,853	(a)	14,200	(b)	22,325
Roofing	4,036	27,623 46,342	7,114	73,651 76,594	5,725	93,58
PencilsAll other						9,46 90,16
		142,977		259, 173		267, 59

<sup>(</sup>a) 1.532 squares valued at \$12,362 and 240 tons crushed slate valued at \$1,838. (b) 415 squares valued at \$4,063 and 2,232 tons crushed slate valued at \$18,262.

#### 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 1921 to a total value of \$6,343,696, as against a value of \$7,580,351 in 1920.

Ontario was the principal producing province, with a production value of \$4,167,582. Quebec came second, with \$1,662,641, while British Columbia, Nova Scotia, New Brunswick, Manitoba 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 decline in the construction industries accounted for the decrease in the year's production.

## Production of Stone in Canada in 1921, by Kinds, showing Purposes for which used

TABLE 171

	Gn	arite	Lime	stone	Mar	rble	Sandstone	
	Tons   Value		alue Tons Value		Tons   Value		Tons	Value
		8		8		\$		\$
Building Rough	9,869	93, 913	26, 694	67,076	472	27, 363	5, 447	28, 148
Dressed	4,660	21,926	8,883	229,337	683	140,300	800	4,500
Monumental and Rough	8.672	102,845						
ornamental Dressed	1.680	148,574	24	1,108				
Flagstone	200	4.800	6				24	441
Curbstone	1,141	4,378	557	4,986				
Paving blocks	13,770	214,770					295	
Limestone, for flux			129,320	233,651				
Limestone for sugar factories,								
chemical works, etc			117,830	135,683				
Rubble and riprap		1.512		51,055			3,360	5,61
Crushed	277,894	345, 176	2, 989, 316	4, 400, 444	495	5,057	18,500	37,00
Total	319, 398	937,894	3, 322, 024	5, 155, 046	1,650	172,720	28,426	78,03

## Production of Stone in Canada in 1921, by Provinces, showing Purposes for which used

TABLE 172

		Nova Seotia	New Bruns- wick	Quebeo	Ontario	Manitoba	Alberta	British Columbia	Total for Canada
Building Rough. T	\$	2,549 14,006	800 4 500	23,098 108,120 13,172 379,610	6,080 14,672 1,054 11,953	20,992		44,960	42,482 216,500 15,026 396,063
Monumental and Rough T Ornamental Dressed. T	8	550 12,664 75 1,893	3,114 36,918 55 9,975	3,057 38,891 1,371 119,513	1,951 14,372 73 3,801				8,677 102,845 1,704 149,687
	ons .	,	200 4,800 141 2,128		30 552				230 5,353 1,698 9,364
Paving blocks	ons	41,974	1,351 15,321	6,317 181,698 1,000 700	7.677 51,682 55,742 145.064				15,343 248,701 129,320 233,651
Limestone for sugar factories T chemical works etc.	8			50,354 46,068	64,264 83,190			3,212 6,425	117,830
	ons \$ ons \$	4,085 11,075 32,178	9,464 23,648	20,964 21,632 598,913 759,975	23,478 21,089 2,555,731 3,821,207	4,332 9,860 9,379 25,012		1,512 1,512 104,643 125,657	52,986 58,178 3,286,205 4,787,677
Total T	ona \$	58,923 116,602	15,125 97,290	719,499 1,662,641		16,868 56,666	2,962 13,750		3.671,498 6.343,696
Per cent of TotalQuan	lue	1·60 1·84	0·41 1·53	19·60 26·21	73-98 65-70	0:46 0:89	0 - 08 0 - 22	3·87 3·61	100-00 100-00

## Production of Stone in Canada in 1921, by Kinds and by Provinces $T_{ABLE}$ 173

Dinc.		anite	Lime	stone	Ma	urble	Sandstone	
Frovince	To ns Value		Tons   Value		Tons	Value	Tons	Value
Nova Scotia New Brunswick Quebec. Ontario. Manitoba Alberta British Columbia	165, 418		679,446 2,547,625 16,868	1,072,572 3,927,836 56,666	1,650	172,720	3,037	\$ 14,06 4,50 39,32: 6,39: 13,750
Total for Canada	319,398	937,894	3,322,024	5, 155, 046	1,650	172,720	28,426	78,03

## Production, Imports and Exports of Stone, by Kinds and by Provinces, 1919, 1920 and 1921

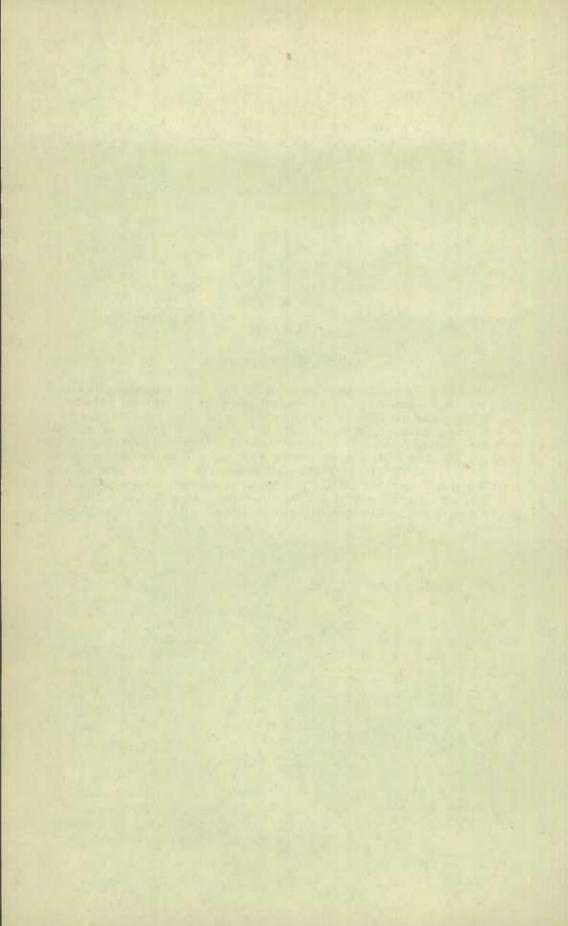
	19	19	19	920	19	21
	Tons	Value	Tons	Value	Tons	Value
		s		s		8
Preduction, by kinds— Granite. Limestone. Marble. Sandstone		850,563 3,074,815 213,982			3,322,024 1,650	937,89 5,155,040 172,720
Total					3,761,498	
Protected by presides Nova Scotia New Brunswick Quebec Ontario Manitoba Alberta British Columbia		1,441,919 1,936,268 89,067 3,189		420, 175 280, 167 2, 189, 325 4, 035, 478 374, 286 4, 415 276, 505	. 15,125 719,499 2,716,080 16,868 2,962	97,296 1,662,641
Total for Canada.		4,225,937		7,580,351	3,671,498	6,343,69
mports Building stone. Granite Marble Refuse stone.		438,623	461,813		236, 024	297, 29: 71, 24: 429, 51: 129, 64:
Total		960,925		1,217,216		927,69
rports— Crushed Ornamental, rough (a) Building, rough (b) Dressed	. 846. 16,859	12,990 7,118 23,899 10,108		55,994 16,941 16,246 13,807	2,324 1,123 3,523	8,648 13,343 8,990 26,933
Total		54,115	******	102,988		57,92

<sup>(</sup>a) Grante, marble, etc., mayrought. (b) Freetone, linestone, etc., unprought,

#### PART II

#### GENERAL STATISTICS

Supplementing the statistics reported in Part One, general reviews have been prepared showing for each principal group in the mineral industry of Canada, statistics of company capitalization, actual capital employed, number of employees, salaries and wages paid, fuel used, power equipment installed, and miscellaneous operating expenses incurred. General tables present the principal statistics of the industry as a whole as well as by groups and by provinces; one section has been devoted principally to mining and milling; another section reviews the metallurgical industry, and there are separate sections each dealing with the general statistics pertaining to a particular industrial group, as the copper-gold-silver industry, niekel-copper industry, asbestos industry, etc.



### INDUSTRIAL REVIEW

#### MINING AND MILLING

In the following survey a series of tables is presented dealing with the output of the mines separately from any closely allied metallurgical operations. Some difficulty has been encountered in drawing the line between metallurgy and mining in those enterprises which carry on both mining and milling. Examples of such cases are the concentrating, amalgamating and cyaniding mills of the gold mining industry, the large reduction works at Cobalt, which are intimately connected with mining, and such metallurgical operations as the amalgamation of placer gold. In these cases it has been found impossible to make any separation, and the survey which follows includes the product from such enterprises, and covers generally the mining and milling industry. In a later section the smelting and refining industry is described and the series of tables of that section cover those industries which smelt ores either by fire or electrical means.

The tables on the mining and milling industry cover distribution of ownership, capital invested, employees, wages and other data. It might be pointed out that for the large companies such as the smelting and refining companies of British Columbia, and the enterprises operating in the nickel-copper industry, which include mines, smelters and refineries, the tables on distribution of ownership, as given in the mining and milling section, refer to the whole industry, and include the smelting and refining. The item "Capital actually invested" is divided as closely as possible into the different sections as reported by the operating companies. The values of the products are the net values, that is, the gross value as determined from the settlement assay, less any transportation and treatment charges. The output or production comprises ores, concentrates and residues or bullion shipped from the mines in 1921.

The following notes describe the more important data:-

Period Covered.—The report refers to the calendar year of 1921; the days in operation or time worked means the total number of individual days all plants were operated.

Distribution of Ownership.—Shows the total par value of the issued securities, such as stocks and bonds, held in various countries. This table is an excellent indication of the proportion of the different industries owned by residents of foreign countries, and, although relating only to incorporated companies, is in nearly all classes descriptive of the ownership of the industry generally.

Capital Employed.—Operators were required to report the capital actually invested in the property under the following heads:

1. Lands, buildings, plant machinery and tools.

2. Cost of all materials on hand, supplies, finished products, ore on dump.

3. Cash, trading and operating accounts, bills receivable.

Owing to the diversity of methods of book-keeping in use by different companies, the returns for capital employed lacked uniformity and can be regarded as showing only general conditions.

Number of Mines and Operators.—General statistics for some metal mines operating but not shipping have been included, but for non-metal mines and the establishments in the structural materials, and clay products group, the statistics given refer only to those properties which made shipments during the year.

Persons engaged in the industry.—The data are divided to show salaried employees and wage-earners. The employees are shown in three classes and are divided into male and female workers. In the case of wage-earners an

attempt has been made to supply information on the actual number of days' work performed by all workers and the wages paid for that time. The work done is given by man-days, i.e., the actual number of individual days' work done and paid for each month. An average daily wage might be calculated from these data for surface, underground workers or mill men in any industry. On the other hand, in tables where the average number of men employed is given, it should be noted that these numbers have been calculated for each property individually and a total made.

Power Employed.—This table represents the number of units installed, and

power developed by operating companies only.

#### Distribution of Ownership of Securities Issued by Mining Companies Incorporated in Canada as at December 15, 1921

						DO:
	4		,Fi	-1		13
- 3.	13		15%	- 4	4	12

Industry	Par Value of	Issued Secur	ities held by	Residents of	Total
	Canada	Great Britain	United States	Other Countries	2000
Metal Mining— Copper-gold-silver mining and milling! Gold quartz mining and milling? Gold placer and hydraulic mining Iron mining and briquetting? Molybdenite mining and millings Nickel-copper mining and millings	\$ 9,905,844 114,520,383 153,247 6,885,270 4,086,529 5,308,766		51, 268, 921 17, 573, 188 4, 794, 447 3, 158, 305 45, 050, 454	\$ 44,114 213,356 28,885 31,540 248,169 6,809,757	15,685,990 7,495,703 100,409,472
Silver-cobalt mining and millings Silver-lead-zinc mining and millings Total for Metal Mines and Mills	52,867.834 26,099,377 219,827.250	6,092,631 616,313 72,854,970	14,789,731 10,193,511 184,859,755	673,691 2,603,555 10,653,067	74,423,887 39,512,756 488,195,042
Non-Metal Mines— Asbestos mining and milling. Coal mining Gypsum mining and milling. Natural gas Petroleum. Salt. All other non-metallics.	19,724,969 86,727,930 1,484,550 13,237,270 3,388,922 1,469,080 5,721,154	1,467,300 18,721,941 400 2,803,999 7,050 76,600 171,479	25,879,964 1,484,500 6,825,823 2,882,689 305,300	82,500 7,656,638 68,350	29, 202, 049 138, 986, 473 3, 037, 800 22, 867, 092 6, 278, 661 *2, 593, 980 8, 143, 615
Total for Non-Metal Mines	131,753,875	23,248,769	47,555,958	7,808,068	*211, 109, 670
Structural Materials and Clay Products— Cement Clay products Lime burning All other structural materials.	35, 116, 930 19, 505, 891 1, 924, 434 9, 329, 940	4,297,246 563,688 43,600 160,500	809, 100 1, 580, 780 1, 203, 450 503, 610	405,400	40,628,676 21,650,359 3,171,484 9,994,050
Total Structural Materials and Clay Products	65,877,195	5,065,034	4,096,940	405,400	75,444,569
Grand Total	417,458,320	101, 168, 773	236, 512, 653	18,866,535	774,749,281

<sup>&</sup>lt;sup>1</sup> This group was composed of 10 producing, 5 operating but not producing, and 49 idle companies. There was also included the value of the stocks, etc., issued by the Granby Consolidated Mining, Smelting and Power Co., because the most important department of that company was copper production. It might be pointed out that the stocks of this company which operated coal and other non-metallic proporties have been excluded from other compilations dealing with those groups so that duplication has been avoided.

1 Includes 10 idle molybdenite and 2 idle tungsten incorporated mining companies.

<sup>2</sup> Comprises 19 producing, 8 operating but not producing and 34 idle incorporated mining companies. Includes stock of the Consolidated Mining and Smelting Co., Trail.

\*Includes \$743,000 distribution of which was unknown.

<sup>&</sup>lt;sup>1</sup> Includes 32 producing, 25 operating but not producing and 93 idle incorporated companies.

<sup>3</sup> Includes 1 producing, 11 idle companies. Stock of Algoma Steel Company which operates iron properties not included here.

Includes all stocks of nickel-copper companies and refers to mining, smelting and refining.

Includes all silver-cobalt mining, milling and reduction companies situated at Cobalt, Gowganda and South Lorrain, Ontario, 22 producing, 7 operating but not producing and 26 idle incorporated companies. Excludes stock of 3 silver smelters operating in Ontario.

In the following table the principal statistics for the year 1921 are shown under the three main headings, Metallics, Non-Metallics, and Structural Materials and Clay Products. The statistics show capital employed, salaries, wages, and data relating to number of people employed, miscellaneous expenses, cost of fuel used and value of products. All the figures except those under "Capital actually employed" and "Value of products," are complete and final, each industry having been fully covered. In the portion dealing with metallics, the net values given to ores shipped by the mines, were in many cases nominal and were made up from book values used by the companies in crediting the mining part of their enterprises. For instance, it was found in the copper-gold-silver section that in some important cases the ores shipped from the mines were valued at much lower figures than the metal contents would indicate. It must also be pointed out that the value of the products shown in the metal-lurgical section is approximate only, since absolute figures for cost of ores, etc., treated, could not be collected.

The value of the metallic production as given in this table is approximately one million dollars less than the figure given in the first part of this report as the value of the metallic mineral production. The latter is the value calculated from the view point of the world's markets while the data shown in the table below indicates more nearly the actual return to different industries in question.

There is no such difficulty in the value of the production for non-metallics and structural materials and clay products, and the figures given below agree with those shown in other tables.

Summary of Principal Statistics Relative to Mining, Metallurgy, Structural Materials and Clay Products Industries
Table 176 Operating Plants, 1921

	Number of active operators	Number of operating plants or mines	Capital actually employed	Number of salaried employees	Salaries paid	Number of wage-earners	Wages paid	Miscel- laneous expenses	Fuel cost	Total expenditures	Net value of bullion, ore concentrates or residues shipped from the mines and products made by the smelters
METALLICS— Auriferous quartz mining and			\$		\$		\$	8	\$	\$	8
milling	57	59	48,043,363	238	555,307	3,651	5,517,011	5,474,607	455,015	12,001,940	16,689,784
ling	33	39	31, 198, 418	103	257,031	1, 121	1,482,675	1,799,458	108,573	3,647,737	6,316,812
milling	61	72	9,888,4211	71	125, 146	718	841,025	441,752	78,923	1,486,846	2, 177, 053
milling	14 197	18 197	5, 256, 051 <sup>2</sup> 10, 703, 650 <sup>10</sup>		197, 685	1, 137 428 <sup>2</sup>	1,375,536 671,783 <sup>3</sup>	1, 192, 018	76,663	2,841,902 671,783	2,589,314 1,576,222*
milling.  Iron mining and briquetting.  Iron blast furnaces.	3 4	8 4	8, 107, 245 4, 604, 048	39	109,385	816 44	624,851 68,606	641,036 86,855	52.551 45,376	1,427,823 200,837	1,575,558 230,164 1,646,7907
Metallurgical works	9	14 4	82, 206, 253	315	737.657	3,367	3,669,300	6,538,522 *	3,097,514	14,042,993	15, 332, 277
Total for Metallics	378	411	200,007,449	851	1,982,211	11,282	14, 250, 787	16, 174, 248	3,914,615	36, 321, 861	48, 133, 974
Non-METALLICS— Asbestos. Coal mining. Feldspar. Fluorspar Grindstones. Gypsum Magnesite. Mica. Natural gas. Oxides, iron. Petroleum Quartz. Salt. Tulc. All other non-metallics <sup>11</sup> .	11 4 20 104 4 120 11 12	18 396 - 23 3 3 12 4 20 2,022° 4 2,828° 11 13 4 38	41, 35*, 161 176,991, 495 484, 633 163, 257 286, 993 3, 849, 776 2, 108, 227 576, 237 30, 368, 478 207, 567 3, 214, 159 940, 087 2, 267, 708 487, 073 2, 398, 742	124 1,626 12 4 5 36 10 5 125 3 19 8 53 53 5 22	258, 019 3, 717, 238 18, 223 4, 661 6, 540 72, 914 15, 006 7, 738 177, 899 5, 700 31, 879 19, 477 91, 329 19, 725 44, 444	2,570 30,223 131 77 50 766 71 99 760 29 171 86 277 34 312	2,399,406 42,758,471 128,553 24,761 44,645 701,637 73,650 66,694 705,003 36,993 183,912 106,382 320,503 44,978 205,972	2,713,440 18,221,563 55,628 15,316 5,533 565,839 155,996 19,743 1,405,222 32,065 136,277 135,916 381,126 65,607 118,530	318,633 3,795,151 4,237 13,145 6,237 116,554 22,036 4,354 17,564 15,975 527,013 1,565 38,976	5, 689, 498 68, 492, 423 206, 641 57, 883 62, 955 1, 456, 944 265, 788 98, 529 2, 288, 129 92, 322 352, 068 277, 750 1, 319, 971 131, 875 407, 922	4,906,230 72,451,656 230,754 136,267 64,067 1,785,538 81,320 70,063 4,594,164 93,610 641,533 312,947 1,673,685 144,565 656,283
Total for Non-Metallics	718	5,399	265, 701, 593	2,057	4,490,792	35,656	47,801,565	24, 026, 901	4,881,440	81,200,698	87,842,682

53150-	CLAY PRODUCTS— Clay products. Cement. Lime. All others <sup>12</sup> .	216 7 59 375	220 14 66 375 <sup>13</sup>	28,515,928 49,160,180 44,990,969 11,138,035	288 343 87 202	582,760 730,158 131,152 334,279	4,118 2,408 844 2,668	3, 187, 493 2, 713, 726 818, 814 2, 137, 903	1,650,449 2,602,029 407,620 2,634,533	1,812,232 2,788,820 698,992 189,083	7,232,934 8,834,733 2,056,578 5,295,798	8,857,818 14,195,143 2,781,197 8,903,270
9	Total for Structural Materials and Clay Products.	657	675	93,805,112	920	1,778,349	10.038	8,857,936	7, 294, 631	5,489,127	23,420,043	34,737,428
S	ummary by Classes: Metallies Non-metallies Structural materials and clay products	378 718 657		200,007,449 265,761,593 93,805,112	2.057	1.982,211 4,490,792 1.778,349	11, 282 35, 656 10, 038	14,250,787 47,801,565 8,857,930	16, 174, 248 24, 026, 901 7, 294, 631	3, 914, 615 4, 881, 440 5, 489, 127	36,321,861 81,200,698 23,420,043	
	Grand Total	1,753		559, 514, 154		8, 251, 352	56,976	70, 910, 288	47,495,780		140,942,602	
	Nova Scotia Nova Scotia New Brunswick Quebec Ontario Manitoba Saskatchewan Alberta British Columbia Yukon	71 35 104 741 27 (5 302 177 159	109 71 169 5,312 28 65 357 203 159	82, 283, 644 2, 985, 382 81, 494, 918 188, 719, 764 5, 343, 706 4, 761, 177 73, 603, 005 109, 030, 712 11, 241, 846	625 66 507 1,114 51 73 762 625	1,219,264 129,480 978,957 2,313,599 98,954 141,430 1,798,211 1,468,337 23,120	13,504 914 5,805 13,151 752 721 10,828 10,840 461	15, 257, 389 879, 562 5, 134, 716 14, 318, 407 665, 345 585, 543 17, 402, 988 15, 935, 477 730, 891	8,743,396 347,687 5,291,586 15,233,069 519,249 452,204 6,639,782 10,553,669 15,138	2,389,917 112,600 2,217,303 5,105,536 289,992 58,724 882,415 3,197,606 31,080	27,609,966 1,469,338 13,622,562 37,050,611 1,573,540 937,871 26,723,396 31,155,089 800,229	
	Total for Canada	1,74114	6,4731	559,514,154	3,828	8,251,352	56.976	70, 910, 288	47,495,780	14,285,182	140,942,602	

<sup>1</sup> Excluding capital invested by Consolidated Mining and Smelting Company, Trail; and Kingdon Smelter, Galetta.

<sup>2</sup> Excluding capital invested by Granby Consolidated Mining and Smelting and Power Company, Anyox.

<sup>3</sup> Estimate. Incorporated companies in Yukon Territory paid \$624, 783 in wages. Does not include wages paid in British Columbia.

4 Includes 3 silver smelters South Ontario; 5 plants nickel-copper smelters and refineries in Ontario and Quebec; 6 plants copper, lead and zinc smelters, Ontario and British Columbia, and refineries in British Columbia and Ontario.

\* Includes \$524,627 paid for chemicals.

\* Does not include cost of ores concentrates and residues treated.

7 Represents value of pig iron made from Canadian ore, deducting the net value of ores treated.

\* Includes production of Yukon Territory, \$2,394 crude ounces valued at \$16.30 per ounce and production for British Columbia valued at \$233,200

9 Number of wells.

10 Incorporated companies over Yukon Territory.

11 Includes actimolite, barytes, chromite, corundum, magnesium, sulphate, manganese, mineral waters, peut, pyrites, sodium sulphate, and tripolite.

12 Includes stone quarries and sand and gravel.

12 Number of active operators only.

14 Does not include railway ballast operators.

## Power Employed by Operating Companies in the Mining, Metallurgical and Structural Materials and Clay Products Industries in Canada in 1921

Hydraulie

Locomotives (b)

TABLE 177

	17(7)	1010	Tur	oines	Loc	0111001 100	5 (0)	Air com-
	No. of units	Rated H.P.	No. of units	Rated H.P.	Steam	Elec- trical	Com- pressed air	pressors
Metallic mining. Metallurgical works. Coal mining. Non-metallics other than coal. Structural materials and clay products.	131 18 149 174 357	12,486 7,875 81,446 16,408 22,778	54 2 5 27	20,538 12,000 655 1,559	2 24 37 34	57 23 36 12	42	100 18 115 63 60
Total	829	140,993	88	34,752	97	128	44	356
			5	Stationar;	y Engine	8		
	Ste	am	Steam '	Turbines	G	8.8	0	il
	No. of units	Rated H.P.	No. of units	Rated H.P.	No. of units	Rated H.P.	No. of units	Rated H.P.
Metallic mining. Metallurgical works. Coal mining. Non-metallics other than coal. Structural materials and clay products.	60 3 670 109 256	5,891 1,100 100,697 7,394 17,168	8 18 1	9,890 31,702 25 560	31 198 60	348 3,218 969	(a) 23 20 16	1,178 1,943 474 310
Total	1,098	132,250	31	42,177	293	4,645	70	3,905
		Mo	tors			Gene	rators	Team
生。均重的。		nating rent	Direct	current	Alteri	nating rent	Direct	current

	Alternating current		Direct	current	Alteri	nating rent	Direct current	
	No. of units	Rated H.P.	No. of units	Rated H.P.	No. of units	Capa- city K.W.	No. of units	Capa- city K.W.
Metallic mining. Metallurgical works. Coal mining Non-metallics other than coal. Structural materials and clay products. Total.	895 200 600 551 1,620 3,866	56.945 22.178 30,734 30,313 77,332 217,502	40 189 153 78 292 752	3,433 4,770 3,591 4,962 11,560 28,316	20 4 73 11 12 120	4,906 850 44,740 582 1,675 52,753	46 11 61 25 27 170	4,429 2,205 32,497 708 1,484 41,323

Metal Mines

#### Total Fuel Used in the Mineral Industry in Canada in 1921 TABLE 178

Structural Materials

5,489,127 ..... 14,285,182

Kind	Sme		Mir	nes	Clay P		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
		\$		\$		\$		\$
Anthracite coal Tons Bituminous coal "	104,552	1,019.935	1,002,120	4,427,954	533,812	4,675,309	1,640,484	10, 123, 19
Coke	217 143,332 54,734		7,629	96,484	714	8,628	151,675 54,734	2,070,45
Gasoline Imp. gal Fuel oil " Wood Cord	390,385 2,655,157 21,929	354,863	69,387	14,326	55,896	8,103	2,780,440	377,29
Artificial and natural gas M cu. ft.	862,201	267,741	8,662	3,534	1,095,743	58,362		329,63

4,881,440

3.914,615

<sup>(</sup>a) Includes 2 air engines of 125 h.p.(b) Also 3 gasoline locomotives under "Non-metallics other than coal".

### Fuel Used in the Mineral Industry in Canada in 1921, by Provinces

TABLE 179			-111						
Kind	Nova Scotia	New Bruns- wick	Quebec	Ontario	Mani- toba	Saskut- chewan		British Columbia and Yukon	Total for Canada
Anthracite coal Tons		22	2,844						35,478
	563,772		211,498	404,145	19,145	2,108		277,981	192,121
Lignite coal Tons	2,366,398	61,913			197,916 1,107				10,123,198
Value \$					6,054				
Coke Tons Value \$					349 5,705			93,887	
Charcoal Cwt.				53,941	0,700			1,223,595	
Gasoline Imp.gal	4,407	4,366	13,449	13,546 198,484		650		264 221,508	13,810
Value \$	1.828	1,869	5,816	39,039	74	341	12	58,715	107,694
Fuel oil. Imp.gal Value \$	1,038	166				1153		2,084,811 477,301	377,292
Wood Cord Value 8			19,666 113,544		12,854 79,021				143,046 813,802
Artificial and matural gas		3,707							
Value \$		1,499	1,263	51,041			8,093	267,741	329,637
Other fuels Value \$			2,070	105,842					107,912
Total Value \$	9 380 017	112 800	2 217 066	5 100 720	280 002	59 794	889 AIK	2 222 720	14 295 182

### Mine Production in Canada, 1920-1921

200			. 1	20
-	AΠ	11.10	٠ .	2611

TABLE 180						
		1920			1921	
	Ores or minerals mined	Metals, ores concen- trates or minerals shipped	Net value of Shipments	Ores or minerals mined	Metals, ores concen- trates or minerals shipped	Net value of shipments
	Tons	Tons	\$	Tons	Tons	\$
Metalliferous ores— Iron ores. Gold ores— Bullion shipped. Concentrates. Silver-cobalt ores— Mine bullion shipped. Ore and concentrates. Nickel-copper ores. Copper-gold-silver ores. Silver-lead-zinc ures— Lead ore and concentrates.	195,870 1,300,316 579,261 1,135,792 1,779,477 461,925	{ 27 8.456 { 175½ 52,328	12, 088, 474 187, 635 5, 247, 809 4, 703, 215 9, 086, 336 5, 522, 350	\begin{array}{c} 1,880,356 \\ 398,931 \\ 262,593 \\ 1,197,624 \end{array}	{ 31 16,311 { 173} 40,611 262,593 1,042,135	14,774,037 1,915,747 4,157,983 1,575,558 2,589,314
Zinc ore and concentrates		249,136 3	1,520,392	380,073	297,406 3	1,498,716 1,300,877 233,200
Total Metalliferous			43,230,818 108,027,947 41,892,088		1,734,125	28, 953, 933 87, 842, 682 34, 737, 428
To(al,			193, 150, 853			151,534,043

### Contents of Shipments, 1920

TABLE 181

	Gold	Silver	Nickel	Copper	Lead	Zine
	Oz.	Oz.	Tons	Tons	Tons	Tons
Milling gold ores—	MO4 NAM	400 880				
Bullion	581,555					
Concentrates	7,082	169,667				
Silver-cobalt ores— Mine bullion shipped		5, 103, 582				
Mine bullion shippedOre and concentrate		5,301,114				
Nickel-copper ores			39, 156	19,017		
	95,897	584,974		28.482		
Silver-lead-zinc ores—						
Lead ore and concentrate	1,745	2,228,560			18,163	
Zinc ore and concentrate	131	653,618				45,517
Placer mining—						
Yukon	72,750	16,369				
British Columbia	10,719					
			20.100		10.100	10 000
Total	769,879	14, 158, 434	39,156	47,499	18, 163	45,51

### Contents of Shipments, 1921

TABLE 182					
Milling gold ores—					
Bullion	711, 121	120,751			
Concentrates	50.841	1,540,561		1.4	, , , , , , , , , , , , , , , , , , , ,
Silver-cobalt ores—					
Mine bullion shipped		5 060, 454			
Ore and concentrate		3. 294, 581			
Nickel-conner ores		0,202,002	6.995-8	4.745.6	
Nickel-copper ores.  Copper-gold-silver ores.	88.982	418.390	0,000	17, 701 - 9	
Silver-lead-zinc ores-	00,000	110,000		21,101	
Lead ore and concentrate	1,468	1,000,587			4,760 147
Zinc ore and concentrate	8	856,842			29,248 49,399
Placer mining—					
Yukon	65,916	14,831			
British Columbia	11,281				
m . 1	000 015	10 007 007	0.005.0	1 00 440 0	24 000 40 740
Total	929,617	12,307,087	0,995.8	22,448.9	34,008 49,546

### METALLIC MINERAL INDUSTRIES

#### ALLUVIAL GOLD MINING IN CANADA, 1921

Alluvial gold mining in Canada was carried on during 1921 in the Yukon Territory and British Columbia, by 195 firms, comprising 18 joint stock companies, 40 partnerships, and 137 individuals. The 40 partnerships were made up of 92 individuals so the total number active during the period was 18 joint stock companies and 229 others.

The localities where mining operations were carried on and the numbers

engaged were as follows:-

YUKON   Dausson—  Bonanza creek   Bonanza creek   Bonanza creek   Eldorado creek   Milher creek   Milher creek   Gold Run creek   Gold Run creek   I 5 6 6   Wictoria guich   I 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	tal er of iters
Bonanza creek   Bonanza creek   Bonanza creek   Bonanza creek   Fldorado creek   Miller creek   Miller creek   Miller creek   Gold Run creek   Klondike creek   Last Chance creek   Last	
Bonanza creck   Fildorado creek   Milber creek   Milber creek   Gold Run creek   Gold Run creek   Last Clance creek   Last C	
Fildorado creek	
Miller creek       *3       13       16         Hunker creek            Klondike creek	
Eldorado creek	3
Eldorado creek	
Eldorado creek	
Victoria gulch.       1       1         Hunker ereck       13       13         Klondike river opposite mouth of Hunkercreek.       2       2         All Gold creek.       6       6         Last Chance creek       2       7       9         Gold Bottom creek.       9       9       9         Moores gulch.       1       1       1         Independence gulch.       1       1       1         Eighty Pup.       2       2       2         Rogers gulch.       2       2       2         Dominion creek.       2       5       7         Gold Hun creek.       1       1       1         Sulphur creek.       1       1       1         Quartz creek.       1       1       1         Quartz creek.       1       1       1         Quartz creek.       1       1       1         Little Blanche creek.       1       1       1         Forty Mile river.       1       1       1         Sixty Mile and Glacier creeks.       1       1       1         Forty Mile river.       1       1       1       1 <t< td=""><td></td></t<>	
Hunker creek	3
Klondike river opposite mouth of Hunker creek	
All Gold creek. 6 6 6  Last Chance creek 9 9 9  Gold Bottom creek 9 9 9  Moores gulch 1 1 1  Independence gulch 1 1 1  Eighty Pup 2 2 2  Rogers gulch 2 2 5 7  Gold Run creek 1 1 1  Sulphur creek 1 1 14 15  Quartz creek 1 1 17 18  Little Blanche creek 1 1 17 18  Little Blanche creek 5 5 5  Forty Mile river 1 1 1  Sixty Mile and Glacier creeks 1 1 2  Clear creek 3 3 3  Black Hills creek 5 5 5  Thistle creek 5 5 5  Thistle creek 7 7 7  Scroggie creek 8 8 8  Highet creek 9 8 8  Highe	
Last Chance creek	
Gold Bottom creek       9       9         Moores gulch       1       1         Independence gulch       1       1         Eighty Pup       2       2         Rogers gulch       2       5         Dominion creek       2       5         Gold Run creek       1       1         Sulphur creek       1       14       15         Quartz creek       1       17       18         Little Blanche creek       5       5       5         Forty Mile river       1       1       1         Sixty Mile and Glacier creeks       12       12       12         Clear creek       3       3       3         Black Hills creek       5       5       5         Thistle creek       1       1       1         Henderson creek       1       1       1         Rusself creek       1       1       1         Kirkman creek       7       7       7       7       7       7       7       7       7       7       7       7       5       5       5       5       5       5       5       5       5       5       5	
Independence guleh	
Eighty Pup.       2       2         Rogers gulch       2       5         Dominion creek       2       5       7         Gold Run creek       1       1       1         Sulphur creek       1       17       18         Little Blanche creek       1       1       17       18         Little Blanche creek       5       5       5       5         Forty Mile river       1 <t< td=""><td></td></t<>	
Dominion creek	
Dominion creek	
Sulphur creek         1         14         15           Quartz creek         1         17         18           Little Blanche creek         1         1         1           Eureka creek         5         5         5           Forty Mile river         1         1         1           Sixty Mile and Glacier creeks         12         12         12           Clear creek         3         3         3         Black Hills creek         5         5           Thistle creek         1	
Quartz creek       1       17       18         Little Blanche creek       1       1       1         Farcka creek       5       5       5         Forty Mile river       1       1       1         Sixty Mile and Glacier creeks       12       12       12       12         Clear creek       3       3       3         Black Hills creek       5       5       5         Thistle creek       1       1       1         Henderson creek       1       1       1       1         Russell creek       1	4
Little Blanche creek       1       1         Earcka creek       5       5         Forty Mile river       1       1         Sixty Mile and Glacier creeks       12       12         Clear creek       3       3         Black Hills creek       5       5         Thistle creek       1       1         Henderson creek       1       1         Rusself creek       1       1         Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8         Haggart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitehorse—       3       3	
Eureka creek       5       5         Forty Mile river       1       1         Sixty Mile and Glacier creeks       12       12         Clear creek       3       3         Black Hills creek       5       5         Thistle creek       1       1         Henderson creek       1       1         Russell creek       1       1         Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8         Haggart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitehorse—       3       3	
Forty Mile river         1         1         1         1         1         Sixty Mile and Glacier creeks         12	
Sixty Mile and Glacier creeks       12       12         Clear creek       3       3         Black Hills creek       5       5         Thistle creek       1       1         Henderson creek       1       1         Rusself creek       7       7         Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8         Huggart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitehorse—       3       3	v-
Clear creek       3       3         Black Hills creek       5       5         Thistle creek       1       1         Henderson creek       1       1         Rusself creek       1       1         Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8         Haggart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitehorse—       3       3	2
Black Hills creek       5       5         Thistle creek       1       1         Henderson creek       1       1         Rusself creek       1       1         Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8         Haugart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitchorse-       3       3	
Thistle creek       1       1         Henderson creek       1       1         Rusself creek       1       1         Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8         Haggart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitchorse—       3       3	
Henderson creek	
Kirkman creek       7       7         Scroggie creek       5       5         Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8       8         Haggart creek       6       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitchorse—       3       3	i
Scroggie creek         5         5           Barker creek         3         3           Nansen creek         5         5           Highet creek         1         8           Haggart creek         6         6           Dublin gulch         3         3           Johnson creek         3         3           Whitehorse—         3         3	
Barker creek       3       3         Nansen creek       5       5         Highet creek       1       8       8         Haggart creek       6       6       6         Dublin gulch       3       3       3         Johnson creek       3       3       3         Whitehorse—       3       3	
Nansen creek       5       5         Highet creek       1       8       8         Haggart creek       6       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitchorse       3       3	
Haggart creek       6       6         Dublin gulch       3       3         Johnson creek       3       3         Whitehorse       3       3	5
Dublin gulch         3         3           Johnson creek         3         3           Whitehorse—         3         3	
Johnson creek	
Whitehorse—	
	,
	3
Cottoneva creek. 1 1	
Iron creek	
Bullion creek	
Fourth of July creek	
Total	
7 subsidiaries	
British Columbia	
Mining Division	
Atlin	
Cariboo. 1 14 15 Similkameen. 1	
Fort Steele 2 3 5	•
Stikene and Laird 1	
Total 8 51 59	

These three companies were mainly engaged in dredging.

The production from these areas totalled \$1,576,222, of which \$1,343,022 was credited to the Yukon and \$233,200 to British Columbia. The total number of crude ounces recovered was 95,720, of which 82,394 ounces came from the Yukon, leaving 13,326 crude ounces credited to British Columbia.

#### YUKON OPERATIONS

The principal operators in the Yukon were the Yukon Gold Company Limited, and the New North West Corporation Limited, Burrall and Baird Limited, and the North American Transportation and Trading Company. This latter firm sublet all its mining claims, did no operating and at the time of writing was in process of liquidation. Messrs. Burrell and Baird Limited controlled 7 subsidiary companies which have been reported under one head.

On account of the isolation of the smaller operators and the lack of mail service, much difficulty was met with, in the collection of statistics, and the returns received amounted to only about 70 per cent. However, the statistics for "Distribution of Ownership" may be considered complete while the data on machinery, ditches and other items will closely approximate the actual, since

most of the individual operators possessed only small workings.

Par Value of Securities, Issued by Joint Stock Companies in Placer Gold Mining, Yukon Territory, as at December 15, 1921

TABLE 104	Held by Residents of					
	Canada	Great Britain	United States	Other Countries	par value of issued securities	
Stocks. Bonds. Other securities.		1,916,620		\$ 28,885	1,916,620	
Total for Canada	18,780	11.766, 154	17,446,760	28,885	29, 260, 579	

As will be noted in the above table, 40 per cent of these stocks were owned in Great Britain and 59.6 per cent in the United States. Canada held only a

negligible quantity.

In Table 185 statistics are given in connection with the working of placer mines. The data given under the three joint stock companies, also cover the subsidiary companies controlled by Burrell and Baird, Ltd., and the New North West Corporation. These companies were responsible for the recovery of over 73 per cent of the total gold won. In the recovery of 69,473 crude ounces some 5,148,750 cubic yards of material was handled. From the value of the gold recovered and the number of cubic yards, the estimated recovery per yard was about 181 cents. The individual operators in many cases could not closely estimate the vardage of material moved but from figures returned it was calculated that some 850,000 cubic yards were handled in order to recover 21,921 crude ounces. At this rate, the recovery per yard averaged about 40 cents. The worth of this figure is questionable from a statistical point of view, as it cannot be estimated how closely the 850,000 cubic vards approached the true figure. Individual returns showed great variation: recoveries of from a few cents up to five, eight and ten dollars per yard were reported. Six dredges were used and were equipped with from 69 to 82 buckets of 71 cubic feet capacity. Two of these dredges were designed for reclamation of ground dredged. The power used was in all cases electric. Of the 34 giants in place, only 13 could be used during the season on account of the limited supply of water.

Returns from joint stock companies engaged in placer mining in British Columbia were not so complete as from the Yukon. There were some eight companies operating which compared to those of the Yukon, were small. The issued securities were also insignificant. The value of the British Columbia output was \$233,200 as reported by the British Columbia Mines Department. The bulk of this recovery was made by individual operators of whom there were several carrying on important operations in Atlin and Caribou. Single returns showed a great divergence in recovery, ranging from 5 cents to \$4.10 per cubic yard. Among the many different methods of working reported, drifting and sluicing was extensively used. There were also operated some twenty giants in hydraulic mining, the greatest recovery being made by this method. Dragline excavators, dump cars and derricks were also in use.

Summary Statistics of Placer Gold Mining in the Yukon Territory in 1921 TABLE 185

Item	Joint Stock Companies (a)	Other Operators (b)	Total
Fime in operation	60,473 at \$16.30 \$985,710	(c). 80 \$47,000 21,921 at \$16.30 \$357,312	6-8 428 \$671,783 82,394 \$1,343,022
Quicksilver purchased. 1b. Quantity of material handled cubic yards ength of ditches. miles dachinery installed— Giants.	5,148,750 111	(c) 25 Unknown (e) 75	320 186
Dredges Capacity of dredges, cubic yards per 24 hours. Excavators Scrapers	3,000	1	$\begin{array}{c} 6 \\ 3,000 \\ 1 \\ 2 \end{array}$

(a) Three Joint Stock Companies.

(c) These items were estimated for the total 178 operators of which about 30 per cent did no

return statements.
(d) Only 13 were used, on account of low water.

### **AURIFEROUS QUARTZ MINING AND MILLING**

The recovery of gold from gold quartz ores has been carried on in Canada for many years. Until about the year 1909, when the Porcupine gold field was discovered in Ontario, the bulk of the gold bullion produced directly from quartz veins, came from British Columbia. The quantity of this particular kind of gold was never important until the Ontario fields were developed, and at the present time the Porcupine area and that of Kirkland Lake (discovered about

1911) account for the larger proportion of the Canadian production.

The auriferous quartz mining and milling industry in Canada produced 711,100 fine ounces of gold and 120,746 fine ounces of silver during 1921, the net value of which to the mines was \$14,774,036, not including some \$1,380,000 which was received as premiums on exchange. Of this total, Ontario produced \$14,693,401 or 99 per cent. The production of gold in Canada was higher in 1921 than in any of the previous four years, and while nearly all of the production for the period was credited to Ontario there were important deposits in British Columbia especially, which though then idle would, in more favourable times, increase the production of gold in that province. Most of the gold bullion produced in Canada was recovered by means of the cyanide process, which was practised largely in the Porcupine and Kirkland Lake areas, and in some British Columbia gold mills. In Porcupine, the Hollinger mill operated some 200

stamps followed by cyanidation. The Hollinger and the Dome Mill are the largest mills of their kind in Canada. The McIntyre mine used the cyanide process, while at the Dome mines a combination of the amalgamation and cyanidation processes was employed. In Kirkland Lake all the operating plants were cyanide mills and were owned by the Wright-Hargreaves, the Lake Shore, the Teck Hughes, Kirkland Lake Gold, and Montreal-Ontario Companies. The following table shows the operating mills in Ontario with their daily capacities, also depth of mines.

#### Ontario Gold Mines in 1921

TABLE 186

Company	Mill	Daily Capacity	Depth of Mining
Porcupine Area— Hollinger MoIntyre DomeMines	200 stamps and cyanidation	Tons 1,000 550 1,100	Feet 1,250 1,875 1,150
North Crown—idle  Kirkland Lake—	60 stamps, amalgamation and cyanidation.		
Wright-Hargreaves. Teck-Hughes. Kirkland Lake Gold. Lake Shore.		200 150 150 70	700 760 1,000 600

In Nova Scotia and Manitoba amalgamation in stamp mills with or without plates, was used entirely. In British Columbia the general practice in 1921 was amalgamation of the ores in stamp mills followed by concentration of the tailings which were then shipped to smelters. The largest mines used the cyanide method as did the Premier Gold Mining Company, while the Pioneer Gold Mines, Limited, use a Chilian mill followed by plating and cyaniding. The following is a list of the operating plants:—

### British Columbia Gold Mines in 1921

TABLE 187

Company	Mill	Capacity	Depth of mining
Nugget Gold MinesPioneer Gold Mines	Amalgamation and concentration (idle) Cyaniding Chilian Mill and amalgamation and cyaniding Concentration and cyaniding	Tons 30 70 (20) (40) 100	Feet 128 300 770

In Nova Scotia the milling operations carried on were more or less intermittent or in the form of trial runs. Two incorporated companies and one partnership milled about 100 tons. The operating lessees of which there were five or six, delivered small quantities of ore to local custom gold mills for amalgamation. The ore in Nova Scotia is entirely free milling and the cyanide process is not used.

#### Nova Scotia Gold Mines in 1921

TABLE 188

Company	Mill	Depth of Mining
Montague Gold Fields, Ltd	10 stamp mill (amalgamation)	Feet 90 400 260

In Manitoba the milling plants are small and are as yet more or less in the experimental stage.

#### Manitoba Gold Mines in 1921

TABLE 189

Company	Mill	Daily capacity	Depth of mining
Gold Pan Mining Company	5 Stamps—amalgamation and concentration.	Tons	Feet 290
Herb Lake Gold Mines	Chilian Mill—amalgamation and con- centration	35	270

During the year, gold was produced from auriferous quartz mines in the following provinces in order of importance, Ontario, British Columbia, Nova Scotia and Manitoba. The Ontario areas of production as mentioned above were the Porcupine and Kirkland Lake fields, which are situated about 75 miles north of Cobalt, with a few ounces from the Sturgeon Lake country north of Port Arthur. British Columbia's producers were the Nugget and Pioneer Mines which produced and sold some 3,311 fine ounces. The famous Nickel Plate mine of the Hedley Gold Mining Company did not produce gold bullion during this period. In Manitoba, the Gold Pan Group in Rice Lake district and the Rex and Bingo in The Pas country made shipments totalling one hundred ounces or so, only the Gold Pan and the Rex reporting operations. Nova Scotia was a producer to the extent of some 418 fine ounces, which came from the Sherbrooke Mines and Power Company, Hilchey Mining Company and Montague Gold Fields, Limited. A few small lots were also marketed by lessees and prospectors. During 1921 the gold mining industry benefited considerably by the difference in exchange between United States and Canadian currency. All shipments were marketed at the Royal Mint, Ottawa, for which payment was made in New York funds. The average premium for the year was around eleven per cent.

The producing mines (gold quartz ores and bullion) by provinces were as follows:

Company or Owner	Name of Mine	Location
Ontario-		
The Hollinger Consolidated Gold		(13. 1.1 (13. (13
Mines, Limited	Hollinger	
McIntyre-Porcupine Mines, Ltd		46 66
North Crown Porcupine Mines, Ltd.		66 66
Lake Shore Gold Mines	Lake Shore	
Wright Hargreaves Mines	Wright Hargreaves	46
Teck Hughes Gold Mining Co	Teck-Hughes.	46
Kirkland Lake Gold Mines	Kirkland Lake	46 66
Ontario Kirkland Gold Mining Co.		
(no shipments of bullion made)	Hurd	44
Argonaut Gold Limited	Huronia	Gauthier Tp., "
St. Anthony Gold Mine	St. Anthony	Sturgeon Lake, Inunder Day.
Contact Bay Mines, Ltd	Redeemer Contact	66 44
Pilon & Richards	T.B. 1471–2	
British Columbia—		
Nugget Gold Mines, Ltd	Nugget Group	Nelson M.D., W. Kootenay.
Horn Silver Mines Partnership		Similkameen Yale.
IXL Mining & Milling Co., Spokane		
leased to Shelledy et al	IXL	Rossland.
Pioneer Gold Mines, Ltd	Pioneer	Lillooet.
Alex. McDonald	Gold Hill	Nelson, W. Kootenay.
A. N. Ross	Champion Hill	44 44
Convan Mining Company	Marjorie	Texada Island, Skeena.
Goldskiesh Mines, Ltd	Goldskiesch	
Premier Gold Mining Co		Portland Canal, Skeena.
New Hazelton Gold Cobalt Mines,	7 11 0	0 : 61
Ltd Kitselas Mountain Copper Co	Indian Group	Omineca, Skeena.
Kitseias Mountain Copper Co	Cordinera Group	
Nova Scotia-		
Sherbrooke Mines Power Co	Goldenville	Halifax Tp., Halifax Co.
Hilchey Mining Co	Hall-Hilchey	46 46
	Skerry	
	IXL and Toronto	Hants Co.
Six individual lessees and prospec-		
tors.		
Manitoba—	Cold Per Crown	Rice Lake.
Gold Pan Mines, Ltd. Bingo Mines, Ltd. (idle)		Herb Lake, Pas District.
Herb Lake Gold Mines, Ltd.	Rex	de la
Alter Lanc Gold mines, Live		

In addition to the production by the companies listed above there was considerable gold produced from the copper-gold-silver mines and also from placer operations in the Yukon and Northern British Columbia which has not been included in this description.

Table 190 shows the character of ownership, and the distribution of issued stocks, bonds and other securities, with capital invested. The total number of mines in the Dominion which produced gold, or ores in which gold was the chief constituent, was thirty-two, twenty of which were operated by incorporated companies. The individual owners and partnerships, with a few notable exceptions such as the operators of the IXL mine in British Columbia, were of small importance and were included only for the purpose of completing the data for each province. The net value of their products was under \$45,000, out of a total of some 16 million dollars. Gold quartz mining is carried on almost entirely by large corporations capable of investing great amounts of capital.

The total investment in this industry for the whole Dominion was \$37,874,870, of which over 76 per cent, or \$28,752,321, was placed in Ontario. The total net value of the products was \$14,774,036 for gold bullion and \$1,915,747 for ores, concentrates and slags shipped to smelters, making a total of \$16,689,783 net to the mines. This industry is predominately Canadian in ownership, \$41,433,086 out of a total of \$59,444,385 of the stocks and bonds,

etc., being held in Canada.

# Capital Invested in the Auriferous Quartz Mining Industry in Canada, with the Distribution of Ownership of Securities Issued by the Incorporated Companies, 1921

Table 190							
Province	Total	Total Par Va	rporated Con		held by I		
Trovince	actually em- ployed*	Security	Canada	Great Britain	United States	Other Countries	Total
	8	SHIPP	s ING MINE	\$ 8	33	8	\$
Nova Scotia	1	Stocks			899,932		1,119,332
		Bonds			35,900		35,900
Total	391,834		79,600				1,155,232
Ontario		Stocks Bonds	35,990,757 101,000		11,463,027 498,000	67,371	47,906,850 600,000
Total	28, 752, 321		36,091,757	386,695	11,961,027	67,371	48,506,850
Manitoba			Information	not availa	ble.		
British Columbia		Stocks Bonds	5,211,730 49,999		4,518,559	9	9,732,303 49,999
Total	8,612,079		5,261.729	2,005	4,518,559	9	9,782,302
CANADA		Stocks Bonds	41,282,087 150,999		16,881,518 533,900		58,758,485 685,899
Total	37,874,870		41,433,086		17,415,418		59,444.384
	OPER	ATING BUT	NOT-SHI	PPING			
Ontario				2, 972, 635	5, 271, 539 50, 000	400	25, 936, 537 50, 000
Total	9,746,603		17,691,963	2,972,635	5,321,539	400	25,986,537
British Columbia		Stocks	832,870	400	289,842		1, 123, 112
Total	416,890		832,870	400	289,842	,,	1, 123, 112
CANADA		Stocks Bonds	18,524,833	2,973,035	5,561,381 50,000	400	27,059,649 50,000
Total	10, 163, 493			2,973.035			27,019,64
		NON-OPEI	RATING M	INES			
Nova Scotia	1	Stocks			300,000		300,000
Total	2,500				300,000		300,000
Ontario		Stocks Bonds	47,160,500 31,700		21,469,668		69, 168, 787 43, 200
Total	10, 761, 704		47, 192, 200	-	21,481,168		69,211,987
Manitoba		Stocks	5,826,778	36,033	3,309,466	250	9, 172, 527
Total	439, 950	,	5,826,778	36,033	3, 309, 466	250	9, 172, 527
British Columbia		Stocks	1,543,486	20,000	3, 151, 488	10,000	4,724,974
Total	3,674,294	, , , , , , , , , , , , , , ,	1,543,486	20,000	3,151,488	10,000	4,724,974
CANADA-Total	14,878,448		54,562,464	459,326	28, 242, 122	145.576	83,409,488
	TOTAL	FOR ALL G	OLD MINE	S IN CA	NADA		
Shipping mines Operating (developing		Stocks, bonds	41,433,086		17,415,418		
only)	10, 163, 493		18,524,833 54,562,464		5,611,381 28,242,122	400 145,576	27, 109, 649 83, 409, 488
Grand Total	62,916,811		114, 520, 383	3,960,861	51, 268, 921	213,356	169, 963, 521
NOTE.—In the tota	ls for non-o	nerating gold r	nines, the fig	ures given	cover the	more imp	ortant incor

Note.—In the totals for non-operating gold mines, the figures given cover the more important incorporated companies excluding those companies which at the end of 1921 had not issued any important number of shares. On account of numbers of properties being idle, and also as many apparently had no permanent offices, some difficulty was encountered in securing complete returns. The figures given in this table are relative only, and show approximately the proportion of stock held by residents of the various countries and cover between 85 and 90 per cent of all gold mines in Canada.

Table 191 of this section and the similar table in the copper-gold-silver section show that, while the underground development in the auriferous quartz mines was much less than in the copper-gold-silver, the tonnage of ore produced in the former exceeded the quantity in the latter. The figures were: auriferous quartz, total length underground workings 245,743 feet; copper-gold-silver, 667,279 feet. Ore mined in auriferous quartz totalled 1,908,286 tons and in copper-gold-silver 1,197,624 tons. In comparison with the last mentioned industry and with all other metal mining industries, gold mining is seen to be the most extensive as regards people employed, wages paid and equipment installed.

#### Ore Mined and Underground Development in the Producing Auriferous Quartz Mines in Canada in 1921

TABLE 191

Province	Number of Mines	Shafts in Operation	Length of Adits or Tunnels	Total Length of Underground Workings	Ore mined
Nova Scotia. Ontario. Manitoba. British Columbia.	8 11 2 11	8 17 2 2	Feet	Feet 3,980 226,627 1,085 14,051	Tons 726 1,867,848 683 39,029
Total for Canada	32	29	6,036	245,743	1,908,286

#### Ores Mined and Milled, Crude Bullion Produced and Shipped from the Gold Mines in Canada in 1921

TABLE 192

	Nova Scotia	Ontario	Manitoba	British Columbia	Total for Canada
Number of mines	8	11	2	11	32
Ore mined tons		1,867,848			1,908,286
Ore milled for amalgamation	696		484	200	373,463
Bullion recovered by amalgamation crude oz.	465	76,063		1,401	
Ores cyanidedtons					76,910 1,729,426
Bullion recovered by cyanidation crude oz.		026 745		5.117	
Bullion shipped"	(c)451				913.869
Contents of bullion shipped Gold fine oz.	418				711.100
Silver	21	120,335		356	120,746
W11 V U 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2.	120,000	- 00	000	120,710
Net value\$	8,470	14,693,402	4,206	67,959	14,774,037

(a) This 1,716,946 tons cyanided includes the tailings from the 372,083 tons amalgamated.
(b) This 12,480 tons cyanided does not include the tailings from the 200 tons amalgamated.
(c) 439 fine oz. reported as received at the Royal Mint, 21 fine oz. hand picked from old dumps.

## Ores, Concentrates and Slags Shipped from the Gold Mines in Canada in 1921

		o Mines pping	British Colu Shipp	Total	
	To Canadian Smelters	To American Smelters	To Canadian Smelters	To American Smelters	for Canada
Number of mines. Tons of ore, etc. shipped		I 43	9 9,787	6,481	16,311
0.11	• • • • • • • • • • • •	870 3,730	1,830 54,341 2,192	49,971 1,536,921 2,808	52,671 1,594,992 5,000
Net Value \$		19,640	72,087	1,824,020	1,915,747

#### Salaried Employees and Salaries Paid in Auriferous Quartz Mines and Mills in Canada in 1921

TABLE 194

	On	Mine Pay	-Roll	On Mill Pay-Roll			Total for Mine and Mill		
	(	n ber of loyees	Salaries	(	nber of oyees	Salaries	(	n ber of loyees	Salaries
	Male	Female	8	Male	Female	8	Male	Female	\$
Nova Scotia—									
(a) 8 Producing Mines— Supts., managers, etc Technical employees, etc	4		7,476				4		7,47 1,30
Clorks, stenographers	i		1,375				i		1,37
Total	6		10,151				6		10,1
ONTARIO-									
(a) 11 Producing Mines— Supts, managers, etc Teclinical employees, etc	18 58		114, 940 122, 812	9		45, 214 36, 625	27 75		160, 1, 159, 4;
Clerks, stenographers, etc	42	4	79,882	9	1	17,479	51	5	97,3
Total	118	4	317,634	35	1	99,318	153	5	416, 9
(b) \$1 Non-Producing Mines- Supts., managers, etc	22	1	47,740				22	1	47,7
Technical employees, etc	11 12		11,645 16,362				11	34777734	11,6 16,3
Total	45	1	75,747				45	1	75.7
(c) Total, all operating mines	163	5	393,381	35	1	99,318	198	6	492.6
MANPTOBA—  (a) 2 Producing Mines—  Supts., managors, etc	2		2,250	1		800	3		3,0
Technical employees, etc Clerks, stenographers, etc	1		450				1		4
Total	3		2,700	1		800	4		3,5
BRITISH COLUMBIA—									
(a) 11 Producing Mines— Supts., manugers, etc	7	,	17,712	2		5,688	9		21, 4
Technical employees, etc Clerks, stenographers, etc	4 8		7,568 12,689				4 8		7, 5 12, 6
Total	19		37.969	2		5,688	21		41,6
									-
(b) & Non-Producing Mines— Supts., managers, etc	2		5, 100	*	1 2 4 2 2 2 2 3		2		5,1
Technical employees, etc Clerks, stenographers, etc	····i		200	* * * * * * * * *			1		2
Total	3		5,300				3		5,3
(c) Total, all operating mines	22		43,269	2		5,688	24		46,9
Canada—									
59 Mines—	55	1	195,218	12		51,702	67	1	244, 9
Technical employees	74 65	4	143,325 [10,958]	17 19	1	36,625 17,479	91 74	5	179,9 128,4
to and aconographics ( Cott., , , .	194	5	449,501	38	1	105,806	232	6	553.3

In Table 195 the data showing the wages paid and the man-days' work performed are given both for mines and mills. By dividing the total for wages paid by the total number of man-days' work performed by the surface and underground workers, a close approximation may be reached of the average wages paid in this industry. For Ontario, the average wage was found to be \$4.57 per day and for British Columbia \$4.45. In Nova Scotia, \$37.914 was paid as wages, but in a few cases, where leasing was done, the statistics were incomplete as to wages, and considerable variation was found between payments to mine and mill workers. The same applied to Manitoba where the

work done was, in some cases, experimental in character and wages paid out were for construction work rather than milling. The average wage for miners in gold mining for Canada was \$4.53.

#### Average Number of Wage-earners, Work Done and Wages Paid in the Auriferous Quartz Industry in Canada in 1921

TABLE 195

Province	Group	Num-		rage per of earners	Man- work	Wages	
		Der	Sur- face	Under- ground	Sur- face	Under- ground	paid
							\$
Nova Scotia	Producing mines	8:	21 13	19	4,580 1,882	6,581	32,440 5,474
	Total	11	34	19	6,462	6,581	37,914
Ontario	Producing mines Non-producing mines.	11 22	351 154	1,801 130	119,955 33,019	629,015 32,010	3,391,896 327,313
	Mills	7	609		221,063		976.174
	Total	40	1.114	1,931	374,037	661,025	4,695,383
Manitoba	Producing mines	2 2	19	19	972 1,060	1,252	9,133 5,330
	Total	4	26	19	2,032	1,252	14,463
British Columbia	Non-producing	11 5	313 18	105 30	113,571 5,441	36,310 4,519	679,979 31,962
	mines.	2	42		9,013		57,310
	Total	18	373	135	128,025	40,829	769, 251
Canada	Non-producing mines.	32 27	704 172	1,944 160	239,078 38,460	673, 158, 36, 529	4,113,448 359,275
	Mills	14	671				1,044,288
	Grand Total.	73	1.547	2,104	510,556	709,687	5, 517, 011

## Fuel Used in all Operating Auriferous Quartz Mines and Mills in Canada, 1921

Kind	Unit of	Onta	rio	British C	Columbia	*Total for Canada	
	Measure	Quantity	Value	Quantity	Value	Quantity	Value
			8		8		\$
Anthracite coal S Bituminous coal Lignite coal Coke Gasoline I Fuel oil Wood	Imp. gal.	1,788 22,893 107 334 5,098 22,165 7,488	1,503	23, 485 110, 616	10,904 22,379		26,340 294,707 1,503 5,902 16,646 55,220 54,697
Total for Canada			381,053		48,674		455,015

<sup>\*</sup>Includes small quantities used by gold mines in Nova Scotia and Manitoba.

## Power and Machinery Employed in all Operating Gold Mines and Mills in Canada, 1921

48	100	123.1	, EC	- 1		7
-		NEED!	150	- 4	a	8

	Nov	a Scotia	0	ntario	Ma	mitoba		ritish lum bia		otal for anada
Kind	No. of units	Total H.P. ac- cording to manu- facturer's rating	No. of units	Total H.P. ac- cording to manu- facturer's rating	No. of units	Total H.P. ac- cording to manu- facturer's rating	No. of units	Total H.P. ac- cording to manu- facturer's rating	No. of units	Total H.P. according to manu- facturer's rating
Boilers—Fired by hand	2	205	63	6, 153	3	200	1	10	69	6,568
Stationary Engines— Steam	4	185	21 1 1 2	1,593 7 25 12		86	2	40 650	31 1 7 2	1,904 7 710 125
Hydraulic Turbines or Water Wheels	2	500	1	325			4	650	7	1.475
I.ocomotives— Electric. Gasoline			20	438 10					20	438 10
Electric Motors Alternating current Direct current	9	225	409	26, 206 275		,	8	650	<b>42</b> 6	27, 081 275
Generators or Dynamos Alternating current Direct current	2		6 18	K.W.2,100 497	1	5		K.W. 450	9	K.W.2,250 502
Air Compressors	*	Capacity eu. ft. per min. free air 660	33	Capacity cu. ft. per min. free air 2,637	2	Capacity cu. ft. per min. free air 390	8	Capacity cu. ft. per min. free air 587	46	Capacity cu. ft. per min. free air 1,050

## Miscellaneous Expenses Disbursed by all Operating Gold Mines and Mills in Canada, 1921

		100		

	Nova Scotia	Ontario	Manitoba	British Columbia	Canada
	8	\$	\$	8	8
Cost of purchased power for mine or mill use		642,072		57,519	699, 591
or mill	5,691				3, 485, 584
Royalties paid	52 239		330	38,618	
Provincial	200	109,966		45	110,211
Federal	12,433			86,315	419,205 635,268
Total miscellaneous expenses	18,615	4,831,339	4,872	619,781	5,474,607

#### COPPER-GOLD-SILVER MINING

The mines of the copper-gold-silver industry produce ores that are as a rule predominately copper-bearing, although in many cases the copper pyrite contains important quantities of gold and silver as by-products. The provinces producing this ore are, in order of importance, British Columbia, Manitoba, Quebec, Ontario and the Yukon Territory. During the year 1921, only British Columbia, Quebec and Ontario were represented by producing mines and the following tables are made up from data referring to the two former provinces only; the Ontario deposit, the Bruce Mine, which was worked in conjunction with the copper-nickel industry, has been included under that section. Eleven copper-gold-silver mines shipped ore in 1921; ten of these were located in British Columbia and one in Quebec.

The following is a list of the shipping mines of Canada during that year.

#### List of Shipping Mines in the Copper-Gold-Silver Mining Industry in 1921

Name of Company	Name of Mine	Location		
Quebec				
Weedon Mining Company	McDonald	Weedon Tp., Wolfe Co.		
Onterio				
*Mond Nickel Company	*Bruce	Bruce Mines, Algoma		
†British Columbia				
Osborne and Howard	Spokane	Tulameen Atlin West Kootenay, Nelson		
Consolidated Mining and Smelting Company of Canada, Ltd	Emma Le Roi 11 Group	Division  Yale West Kootenay, Nelson Division		
Rossland Velvet Mines Ltd	Velvet Group. Britannia. Venus. Maid of Erin. Surf Inlet.	West Kootenay, Trail Creek Coast Vancouver Division Coast Vancouver Division Cassiar, Atlin Skeena, Q. Charlotte		

\* Included with Nickel-Copper Industry.

During 1921, the copper mining industry like the nickel-copper suffered a severe decline. This was due to the rapid drop in prices which occurred in the last quarter of 1920 and also to the overstocked condition of the world's markets. The precious metal contents of some copper ores enabled a few copper properties to continue in operation. The copper produced in Canada was recovered principally by the large smelters situated at Trail and Anyox, B.C., although important amounts were also derived from the smelting of nickel-copper ores. The principal copper producing mines in British Columbia were the Hidden Creck group of the Granby Consolidated Mining, Smelting & Power Company, Ltd., which mined some 900,000 tons of ore during the year. The Belmont Surf Inlet mined about 130,000 tons. The mines of the Consolidated Mining & Smelting Company of Canada, Ltd., (The Rossland Group and the Emma) produced over 100,000 tons. The other shippers produced small quantities of about one hundred tons. During the period, the Emma mine formerly operated by the Consolidated Mining & Smelting Company of Canada, Ltd., was dismantled.

The ore from the Quebec mines was largely used in the manufacture of sulphuric acid and was also shipped to United States copper smelters. The small quantities of gold and silver contained were not paid for by the smelters.

The copper mines in the Province of Manitoba which, at the present time, are dependent on the British Columbia smelters for the treatment of their ore were able to ship only during the war when the price of copper had reached its highest level. With the poor transportation facilities obtaining and high freight rates, no shipments of copper ore from Manitoba may be expected. The immense deposits of copper sulphide ore of the Flin Flon mine in the Pas district can only be developed by the erection of a smelter near the orebody and the construction of adequate railway facilities.

For the same reason, the copper properties of the White Horse and Conrad districts of the Yukon Territory were idle throughout the period.

<sup>†</sup> Drum Lummon mine also made a small shipment, statistics not available.

As shown in Table 199, the copper industry in Canada was largely owned by foreign interests. At the end of 1921, about 76 per cent of the issued stocks, bonds and other securities were held by residents of the United States. The total par value of the securities issued by the operating copper-gold-silver mines in British Columbia was \$27,899,392 for nine properties.

The total par value of the securities issued by all the incorporated companies controlling copper-gold-silver mines, including producing, developing and

idle properties, was \$51.182,238.

Capital Employed and Distribution of Ownership of the Copper-Gold-Silver Mines in Canada, 1921

	. E . E		Distribution of Ownership							
Kind of Mines	Namber of Companies	Actual Capital Employed	Par Value of S Companies and		Total					
	28	1.Inpioyed	Security		Canada Great Britain		Other Countries			
Producing	3	*28,735,938	StocksBonds	\$ 3,686,477		\$ 17,351,515 3,991,400		\$ 23,957,993 3,991,400		
Total	9	28,735,938		3,686,477	2,920,000	21,342,915		27,949,392		
Developing	5	447,411	Stocks	435, 148	62,688	194,985		692,821		
foral	5	447,411		435, 148	62,688	194,985		692,821		
idle	49		Stocks Bonds Other securities.	5,591.119 73,100 120,000		13,151,698 2,746,600 595,000	34,300	18,971,028 2,854,000 715,000		
Youl	49	8,288,353		5,784,219	218,394	16,493,298	44, 114	22,540,02		
Canada:	63		Stõcks	9,712,744 73,100 120,000		30,698,198 6,738,000 595,000		43,621,838 6,845,400 715,000		
Total	601	37, 471, 702	**1 * * * * * * * * * * * * * * * * * *	9,905,844	3,201,082	38,031,198	44,114	51, 182, 238		

includes capital employed by the Granby M.S. & P. Co. Ltd., which in addition to large copper-

In the following tables, general data of interest regarding the properties and development of the copper-gold-silver industries are given; the tonnage mined, net value of ore shipped, and wages paid are also shown. Few copper-gold-silver mines reported any development work during the period. In British Columbia these operations were as follows: the Coast Copper Company Limited, diamond drilling on the Merry Widow and Old Sports Group; Basil Cartiano, repairs and underground development on the Rompalo and Silver Lump claims; Kleanza Company Limited, surface work and driving tunnels on its Kleanza property. Other work was carried on by the Peerless Mining Partnership, while the usual assessment work was completed by numerous companies, partnerships and individuals. In Ontario and Alberta, a little development was done by the Algomont Mines Limited and Eldon Mines Limited respectively.

### Ore Mined and Underground Development in the Copper-Gold-Silver Mines of Canada, 1921

TABLE 200

Province and Kind of Ownership	Number of Mines	Shafts in Operation		Total Length of Under- ground Workings	Ore Mined
				feet	tons
Guebec— Incorporated Company British Columbia— British Columbia—	1	1		â	1,986
Partnership Incorporated Companies	9	8	5,075	667, 279	1,195,538
TOTAL FOR CANADA	11	9	5,075	667,279	1, 197, 624

Not given.

Only two ore-treating mills reported any operations. These were the mills of the Le Roi No. 2 Limited and the Belmont Surf Inlet. The mills of the Granby Consolidated Mining, Smelting and Power Co. Ltd. at Anyox and the Rossland Velvet were idle throughout the period, and the entire plant of the Britannia Mining and Smelting Company at Britannia Beach was destroyed by fire early in the year. In British Columbia 141,480 tons of ore was concentrated from which 11.884 tons was recovered as concentrates by a combination process of concentration and oil flotation. A large proportion of the British Columbia ores are smelted without preliminary treatment.

In the following table the destination of ores and concentrates shipped from the mines is tabulated. Of the 11 shipping mines only one, the Weedon in Quebec, was located outside of British Columbia, and the statistics are therefore shown together. Of the 1,042,135 tons of ore and concentrates shipped only 38,485 tons went to United States smelters but this quantity included practically all the concentrates produced in Canada.

Shipments from Copper-Gold-Silver Mines of Canada, 1921 TABLE 201

Destination	Quantity	Net			nts as Deter nent Assay	mined
Destination	Quantity Net Value		Gold	Silver	Copper	Sulphur
10 Mines shipped to Canadian smelters—		\$	fine ozs.	fine ozs.	pounds	pounds
Ores				377,849 931		
Ores	† 14,463 24,022		296 37,097	9,259 30,351		416, 189
Total for Canada‡	1,042,135	2,589,314	88,982	418,390	35, <del>109,945</del> 38762	1,582,923

<sup>\*</sup>Includes 3,597 tons pyrites used for manufacture of sulphuric acid.
†Includes 6,608 tons flue dust.
‡Of the 11 shipping mines, 10 were in British Columbia and 1 in Quebec—some of them shipping to both domestic and foreign smelters.

### Salaried Employees and Salaries Paid in Copper-Gold-Silver Mines and Mills in Canada, 1921

TABLE 202

	On Mine Pay Roll			On	Mill Pay	Roll	Total for Mine and Mill		
	Number of Employees		of Salaries		Number of Employees		Number of Employees		Salaries
	Male	Female	\$	Male	Female	\$	Male	Female	\$
In 11 Producing Mines—									
Superintendents and managers	18		82,951	1		2,341	19		85,292
Technical employees	18 35	3	41,795 60,720	2	1	1,339	20 36	4	43,134
Total	71	3	185.466	4		4,519		4	
1 Otal		- 3	180,400		1	4,018	10	4	189,988
In 5 Non-Producing Mines—									
Superintendents and managers	4		5,390		F		4		5,300
Technical employees	1		625 1,775		111		1		1,772
	· 6							-	
Total	. 6		7.700		4.1		6	-	7,700
In All Operating Mines—									
Superintendents and managers	22		88,251	1		2,341			90,593
Technical employees	19	3	42.426 62,495	2	1	1,339		4	43,759
				-	-				
Total	77	3	193,166	4	1	4,519	81	4	197,683

# Average Number of Wage-earners, Work Done and Total Wages Paid in Copper-Gold-Silver Mines in Canada, 1921

TABLE 203

	Average t	number of parners	Man- work		
	Surface	Under- ground	Surface	Under- ground	Wages paid
In 11 producing mines	311 16 42	763 9	81, 163 7, 712 9, 437	205, 356 2, 101	\$ 1,304,724 22,666 51,386
Total for Canada In 16 mines and 2 mills	369	772	98,312	205, 457	1,378,776

## Fuel Used in Copper-Gold-Silver Mines and Mills in Canada, 1921 Table 204

		Fuel used by produc- ing mines	Fuel used by non- ducing mines	Total fuel used
Bituminous coal	Tons	5,445 59,559 124 1,466 246	1 7	5,446 59,566 124 1,466 262
Fuel oil I	mp. gals	85 82,157 12,822	628	97 82,157 12,822 678 2,712
Total value		74, 132	2,531	76,663

## Power Equipment in Operating Copper-Gold-Silver Mines in Canada, 192! Table 205

Kind		Rated horsepower according to manufacturer's rating
Boilers— Fired by hand	11	955
Steam	5 2	625 43
Oil. Hydraulic turbines or water wheels. Electric motors—	1 11	25 14,875
A.C. D.C.	65 16	4,445 275
Locomotives— Steam Electric	1 8	
Electric,	2	870K.W.
D.C  Total rated horsepower of prime movers, exclusive of boilers and generators	1	225 K.W. 20, 288
Air compressors operated. Power shovels operated. Power drills operated.	8 2 by	compressed air

# Miscellaneous Expenses Incurred by Copper-Gold-Silver Mines and Mills in Canada, 1921

$T_A$		

	Producing mines	Non- producing mines	Total
	\$	\$	\$
Cost of purchased power Cost of all materials and supplies used Royalties   Municipal Taxes, {Provincial   Federal. All other sundry expenses.	934, 434 24, 656 4, 976 1, 779 36, 461	1,130 24 10 31,011	109, 389 935, 564 24, 650 5, 000 1, 789 36, 461 79, 159
Total	1,159,843	32, 175	1,192,01

#### THE NICKEL-COPPER INDUSTRY

The nickel-copper mining and smelting industry which is carried on mainly in the Sudbury District in Ontario was represented during 1921 by three operating companies: The Mond Nickel Company, Limited, which in addition to its mine and smelter at Coniston, near Sudbury operated a copper pyrite property at Bruce Mines, Ontario; the International Nickel Company operating mines and smelters at Copper Cliff in the same area, refineries at Port Colborne, Ontario, and in New Jersey, U.S.A.; and the British American Nickel Corporation with mines and smelters at Murray near Sudbury and a refinery at Deschenes, Quebec. In addition to these companies, the Alexo Nickel Mine, in the Porcupine area, although quiescent during 1921, has in the past shipped considerable quantities of ore to Sudbury for smelting. During the period of reconstruction after the war, the nickel-copper industry was forced greatly

to curtail its operations. The large stocks of copper and nickel held in reserve by the warring countries could not be readily absorbed, and as a consequence these war metals moved more slowly towards normal than most others. The state of the world's nickel markets, in 1921 was indicated by a general closing down on the properties controlled by two of the most important companies. The Mond Company operated throughout the year but at a greatly reduced rate. No mining was carried on at Bruce Mines although some shipments were made during the first two months from ore on hand. The International Nickel Company operated for eight months and the British America for two. The refineries continued to operate until nearly the end of the period when these also were closed down.

The data given in the following tables are descriptive of the whole nickel-copper industry including mining, smelting and refining.

Capital Employed—The capital actually invested in properties has been shown in Table 207, division being made to show separately the cost of plant at the mines, smelters and refineries. The Items "Cost of all materials, etc.," and "Cash, trading and operating accounts," refer to the whole industry.

### Capital Employed in the Nickel-Copper Industry in 1921

Buildings, plant machinery and tools:	
Mines	\$ 8,107,245
Smelters	\$13,725,398
Refineries	\$ 8,578,187
Cost of all materials on hand, supplies, finished products and ore or dump	\$10,467,385
Cash, trading and operating accounts and bills receivable	\$ 4,062,590
Total Capital Employed.	\$44,940,805

Distribution of Ownership.—At the end of 1921, about 88 per eent of the total par valuation of the stocks, bonds and other securities issued by the joint stock companies controlling the copper-nickel industry in Canada was held by residents of the United States and Great Britain, 5 per cent was held in Canada, and the balance in various other lands. The total par value of the issued securities amounted to \$100,259,467. Table 208 gives an analysis of these investments, and shows the nature of the securities as well as the amounts held by residents of different countries, but does not include \$150,005 worth of stock which was issued by three undeveloped nickel-copper companies, and which was owned in Canada.

### Par Value of Securities, Issued by Joint Stock Companies in the Nickel-Copper Industry showing the Distribution of Ownership as at December 15, 1921

			20	

TABLE 207

Security		Total Par				
Security	Canada	Great Britain	United States	Other Countries	Value of Issued Securities	
Stocks		19,218,823	754	\$ 2,868,610 306,152 3,634,995	22,546,665	
Total			45,050,454 44·9	6,809,757 6·76		

Properties and Production.—Table 209 classifies the data in connection with the nature and size of the mine workings, the ore mined, man-days' work performed, and wages paid in 1921.

### Nickel-Copper Mines, 1921

У.	A	12	٣.	E	3/1	п	

Number of mines	8
Shafts in operation.	7
Total length of underground workings	105,200
Ore mined (short tons)	*262,593
Days in operation	621
Total man-days' work done:	64.518
Surface. Underground	71.463
Wages paid	†\$615,911

<sup>\*</sup> Includes ore from Bruce Mines.

Two dressing or sorting works were operated in 1921. The British America Company passes its ore through a sorting house, and in 1921 this company paid \$8.940 in wages and sorted 64,881 tons from which 45,366 tons was shipped to the smelters. The Mond Company crushes and concentrates a limited amount, some 26,578 tons being handled in 1921, from which 7,420 tons of concentrates was produced and sent to the smelter. In the present report, the data regarding crushing operations by the Mond have been included with the smelter statement.

The total shipments of ore from the mines to the smelters amounted to 262,593 tons containing 9,701,948 pounds of copper, 13,991,604 pounds of nickel with small amounts of gold, silver and platinum. The average content per ton of ore was 32 pounds of copper or 1.6 per cent, and 56 pounds of nickel or 2.8

per cent.

TABLE 210

## Output from Nickel-Copper Mines and Smelters, 1921

-					_	-
Oun	mined	(m)				
Ore	mamen	1,667	P 0	 *		0

Ore mined (a)	262,593
Contents of ores, etc., shipped: Copper Lb.	
Copper	9,491,327
Nickel	
Ore concentrates treated at smeltersTons	
Matte produced"	19,497
Contents of Matte:	10 045 004
CopperLb.	
Nickel "	19,250,900

<sup>(</sup>a) Includes ore from Bruce Mines.

## Output from Nickel-Copper Refineries, 1921

TABLE 211

THE RESERVE OF THE PARTY OF THE		Quantity	Value
		2.616	\$
	ons	6,648	
Matte treated		5,558	
Products made—	Y 1.	7 500 (100	FF4 000
Refined nickel	J <sub>2</sub> D <sub>4</sub>	1,583,600	554,260
Nickel shot and ingots	44	3,835,574	1,267,657
Nickel oxide	26	7,812,673	1,582,066
Nickel castings	45	14,522	5,896
Converter and refined copper		2,926,407	330,084
GoldFine		179	3,700
Silver		8,818	5,525
Platinum	1	269	20, 184
Palladium		591	38, 267
Iridium and rhodium		56	9,690
Total Value	-		2 017 200
Total Value			3,817,329

<sup>†</sup> Does not include \$8,940 paid for ore sorting work.

Employees and Salaries—The data in connection with salaried officials actively engaged in the works are shown in the next table, and are compiled to show the numbers engaged in each section of the industry. It should be noted that there were in operation seven mines, three smelters and two refineries and owing to the fact that these sections were not run continuously throughout the twelve months it is impossible to use the data for purposes of comparison. The total salaries paid to employees were: Mine, \$109,385; Smelters, \$242,790; and Refineries, \$150,816. A total of 195 persons were employed.

# Salaried Employees by Classes, and Salaries Paid in the Nickel-Copper Industry, 1921

	 -	$G_{1}$	0
11 /	E	21	
			-

	At the Mines		At	At the Smelters		At the Refineries		ries
	Male	Salaries paid	Male	Female	Salaries paid	Male	Female	Salaries paid
Superintendents, managers, etc	11	\$ 55,010	9		\$ 61,590	12		49,798
Engineers, surveyors, chemists, draughts- men, etc. Clerks, stenographers, etc.		\$ 15,302 \$ 39,073	16 49	4	\$ 50,920 \$ 130,280	29 30	7 5	70,882 30,136
Total	39	\$ 109,385	74	4	\$ 242,790	71	7 \$	150,816

Wage-earners, Wages Paid and Time in Operation—The total number of man-days' work done in 1921 has been tabulated for each of the various sections. The greatest number of individual days' work was performed in the smelting division, the total being 217,088 man-days for which \$953,582 was paid. The other sections in order were: mines, 135,981 man-days, and wages, \$615,911; refineries, 93,595 man-days, wages paid \$401,541. The average daily rate of earnings was in the same order as above, smelters, \$4.39 per man-day; mines, \$4.52 per man-day; refineries, \$4.29 per man-day. The total man-days' work done in the whole industry was 448,841, for which \$1,979,273 was paid in wages, making the average earnings in this industry \$4.41 per man-day. The table follows:—

# Work Done and Wages Paid by Months in the Nickel-Copper Industry in Canada in 1921

TABLE 213

		line Statis	ties	Mill St	atistics	Smelter	Statistics	Refinery	Statislies
Month		lan-days" Done	Total	Total	Total	Total	Total	Total "Man-	Total
	Surface	Under- ground	Wages Paid	days" Work Done	Wages Paid	days'' Work Done	Wages Paid	days" Work Done	Wages Paid
lanuary	6.934	16,108	\$ 114,514	1.168	\$ 4.782	32,858	\$ 100 100	10 771	\$
February	7,252	10,870	87,661	1,011	4,158	29,295	150,158 131,890	16,771 15,713	74,711
March	5,497	5,440	50,000			17,988	80,773	14,325	63,748
April	5,558	5.181	48,174			16,988	76,494	7,463	34,801
May	4,891	4,971	44,563			17,131	73,708	6,125	25,242
June	5,202 5,058	5,367 4,660	47,169 42,981			17,450	76,200	7,149	29,696
JulyAugust	5,492	4,806	45.886			17,537 19,174	76,881 83,709	6,218	25,345
September	4.804	3,738	37,886			12.832	57.328	4,102	27,332 16,422
October	4,725	3.644	33,990			12,147	51.395	3,653	13.721
November	4,547	3,475	32,255			11,970	48,525	3,198	12,171
December	4,558	3,203	30,832			11,698	46,521	2,160	8,235
Total	64,518	71,463	615,911	2,177	8,940	217,088	953,582	93,595	401.541

Fuel Used in the Industry—The centralization of this industry in the province of Ontario necessitated the use of imported fuel almost exclusively. Of the total fuel bill of \$974,057, only \$22.958 was expended for domestic fuel. The largest items were those for coke and bituminous coal used in smelting. The total coke used for smelting and refining was 40,534 tons valued at \$625,798, laid down at the plant. The smelting and refining sections used a much larger amount of fuel than did the mining and milling, the comparative figures being \$925,761 for the former and \$48,296 for the latter. The table follows:—

### Fuel Used in the Mines, Mills, Smelters and Refineries in the Nickel-Copper Industry in Canada, 1921

TABLE 214				
LABLE AIT				

Kind	Unit of Measure	Mines a	nd Mills	Smelters and	d Refineries
Kind	measure	Quantity	Cost delivered	Quantity	Cost delivered
Coal— Anthracite. Bituminous Charcoal Coke. Gasoline. Fuel oil. Wood.	Bush. Short tons Imp. gals.	2,577 1,822 92 303 11,514 30	30,048 19,250 1,508 121 1,511 113	393 26, 619 41, 496 40, 534 24, 093 531, 853 654	\$ 6,022 227,375 13,201 625,798 5,753 44,466 3,146
Total			52,551		925,761

Total cost of all fuel used.

\$978,312

Power Equipment.—The power equipment such as boilers, motors, and generators installed in the nickel-copper industry is much greater in power and later in design than that used in any other section of mining and metallurgy in Canada. As shown in Table 215, a total of 25 boilers with a rated horse-power of 9,534 were in place, sixteen of these installations being mechanically fired. Several of these units were used as reserve power and were not fired during the period. Motors operated largely by purchased power numbered 510, of which 318 were driven by alternating and 192 by direct current. The total rated power of the motors was 41,079 h.p. Of this total, motors, aggregating 34,503 h.p. used alternating current while 6,576 h.p. was operated by direct current. The generators installed numbered 23, of which 4 generated alternating current and nineteen, direct. The 4,747 kilowatts generated by these machines would be equivalent to 6,363 h.p.

The air compressors numbered 18 in the mining section, their average capacity being 1,833 cubic feet of free air, per minute. In the smelting and refining, the total of 18 includes a number of blowing engines, the average

capacity being 12,560 cubic feet per minute of free air.

## Power Equipment in Nickel-Copper Industry in 1921

TABLE 215

-64	Minin	g and Milling	Smelting	and Refining	Total for the Industry		
Description	No. of Units	Total H.P. according to manufactur- er's rating	No. of Units	Total H.P. according to manufactur- er's rating	No. of Units	Total H.P. according to- manufactur er's rating	
Boilers— Fired by hand Fired mechanicalty	4 3	225 1,434	5 13	2.000 5,875	9 16	2, 225 7, 309	
Engines— Steam Steam turbines Electric hoists	5	2,100 1,270	3 8	1,100 9,890	8 8 5	3,200 9,890 1,270	
Electric motors— Alternating current Direct current	118	12,325 1,806	200	22,178 4,770	318 192	34,503 6,576	
Locomotives— Steam Electric	1 15		24 23		25 38		
Generators or dynamos—		Total capacity		Total capacity		Total capacity	
Alternating current	8	1692 K.W.	4 11	850 K.W. 2,205 K.W.	4 19	850 K.W. 3,897 K.W.	
Air compressors—	18	Average Capacity 1,833	18*	Average Capacity 12,560	36	Average Capacity 7,300	
	Altro III	cu. ft. per min. free air		cu. ft. per min. free air		cu. ft. per min. free air	

<sup>\*</sup> Includes blowing engines used in refineries.

Miscellaneous Expenditures.—The miscellaneous expenses for the entire industry totaled \$2.368,749 of which those paid for the smelting and refining amounted to some 73 per cent of the whole. As might be expected the various items do not compare closely on account of the great differences in value of plant and other expenses of operation. The item "Cost of purchased power," is the only one which shows any similarity in both sections.

Consumption of Chemicals.—In the smelting and refining processes considerable quantities of chemicals were used and as a matter of general interest a table has been prepared to show the quantities and values of the principal chemical products consumed by the nickel-copper industry. The tables follow:—

Miscellaneous Expenses Disbursed by Mines and Mills, Smelters and Refineries in the Nickel-Copper Industry in Canada, 1921

Table 216

	Mines and Mills	Smelters and Refineries
	\$	\$
ost of purchased power	103,770	142,633
ost of general supplies	245,030	589, 316
oyalties.		. 57,179
[Municipal		127,621
axes Provincial	478	2,477
Dominion	278.360	768, 526
ll other sundry expenses	210,000	100,020
Total	641,036	v 700 005

## Chemicals Used in Nickel-Copper Smelters and Refineries, 1921

Kind .	Quantity Used	Total Cost at Plant
Nitrie acid. Lb. Sulphuric acid. Lb. Sulphuric acid. 1 ons Sodium carbonate ""  Solium chloride ""  ""  ""  ""  ""  ""  ""  ""  ""  ""	436 405 264 163 1,175 968	\$ 325 1,001 58 4,385 23,600 7,787
Nitre cuite. " Char discrimt Lb.	3,654 936	38,461 429
Total		76,046

### THE SHVER-COBALT MINING AND MILLING INDUSTRY

The silver-cobalt mining industry in Canada may be said to date from the time of the construction of the Temiskaming and Northern Ontario Railway, when in the year 1903 evidences of cobalt were found in the railway cuttings near what is now the town of Cobalt, Ont. Native silver was soon discovered and the bulk of the silver produced by the province of Ontario has been found there. Some years later, two smaller camps were opened up, one in South Lorrain, to the south of Cobalt and another at Gowganda to the west. The peak of the silver production occurred in the year 1911, when 31,507,791 fine ounces was produced. With the depletion of the higher grade ores, the output has gradually decreased until the yearly output amounts to about 10 million ounces, around which figure the production will probably remain for some time.

The development underground has been considerable, the total length of underground workings by the producing mines alone amounting now to about 55 miles. Two companies, the Nipissing and the Mining Corporation of Canada, each reported about 27 miles of underground workings. The milling operations carried on in the Cobalt camp resemble those of the gold fields of Porcupine and Kirkland Lake to the North, in that, the mills are operated in conjunction with the mines and a process of cyanidation is used. There is a marked difference, however, in that, customs milling is done by one or two companies at Cobalt and also that ores may be sold by small operators direct to the reduction companies of which there were two producing silver bullion in 1921.

The custom concentrator of the Bailey Silver Mines, Ltd., was the only one operating during the period, while two reduction works, the Cobalt Reduction Company (Mining Corporation of Canada), and the Nipissing Mines reduction plant were active. The two latter plants treated in addition to ores from company-owned mines, considerable quantities of ores and concentrates bought from other properties. Silver bullion was recovered in these plants, and also in two smaller establishments operated by the Coniagas and the O'Brien. The treatment generally was to crush the ore, put it through stamp mills, concentrate on wilfley tables and subject the tailings to flotation or to a treatment with cyanide. The detail of the ores milled and concentrated, etc., is fully given in Table 220.

The silver contents of the ores from the mines vary considerably from year to year. The average number of ounces per ton of ore shipped has exceeded the 2,000-mark on two occasions, 1915 and 1916; but during the past three or jour years the average has been around 900 ounces per ton. Ores and concentrates not treated in the Cobalt Camp were shipped to one or other of the

three silver smelters in Ontario, treating such ores. A considerable tonnage was also exported to American smelters; in the latter case no payment was

made for any cobalt or nickel contained in the product shipped.

During 1921, eighteen companies were active and twenty-two mines were operated. In addition eight idle mines made small shipments of ore from their dumps or of crude bullion recovered in previous years. Of the operating companies in the Cobalt area, the largest producer of ore was the Coniagas Mining Company operating the Coniagas mine and the neighbouring Tretheway; these two mined 117.784 tons. Other important mines were the Nipissing, 80.720 tons; Mining Corporation of Canada, 72,650 tons; and the O'Brien, 54,046 tons. The Miller Lake-O'Brien in Gowganda and the Bailey Silver Mines at Cobalt, each mined over 10,000 tons. Eight mills were in operation, the Bailey (a custom concentrator), the Coniagas, Hudson Bay, O'Brien, Miller Lake-O'Brien, Keeley; and the mills of the two reduction plants belonging to the Nipissing and the Mining Corporation.

#### Silver-Cobalt-Nickel Mines in Canada, 1921

Name of Commons	Name of Mine	Location of Mine		
Name of Company	Name of Mine	Township	District	
roducing Mines	A 12.7:	0.1	770	
daddin Cobalt Co., Ltd	AladdinBailev	Coleman	Temiskamin	
Bailey Silver Mines, Ltd	Beaver	14	44	
lining Corporation of Canada, Ltd	Foster	46	65	
thing Corporation of Canada, Ltd	Townsite	46	11	
46 66 66	City of Cobalt.	44	66	
64 66 66	Townsite Extension	44	46	
Cobalt Silver Queen, Ltd	Silver Queen	64	6.6	
oniagas Mines, Ltd	Coningas and Old Trethe-			
CONTRACTOR AND ADDRESS OF THE PROPERTY OF THE	way	11	46	
Judson Bay Mines, Ltd	Hudson Bay	61	46	
Cerr Lake Mining Co., Ltd.,	Kerr Lake	66	44	
Dominion Reduction Co., Ltd	Dominion	46	44	
ipissing Mining Co., Ltd	Nipissing	46	6.0	
Reeley Silver Mines, Ltd	Keeley	South Lorrain	6.5	
retheway Silver Cobalt Mine, Ltd	Castle	Haultain	61	
I. J. O'Brien, Ltd.,	O'Brien	Coleman	61	
a Rose Mines, Ltd	La Rose	44	64	
enn Canadian Mines, Ltd	Penn Canadian	"	61	
IcKinley-Darragh-Savage Mines, Co	McKinley-Darragh-Savage		44	
lanadian Casey Cobalt Mfg. Co	Casey Cobalt	Casey	64	
Jorace F. Strong	Frontier	South Lorrain.	61	
Regent Mines, Ltd	Regent	James	4	
rown Reserve Mining Co., Ltd	Crown Reserve	Coleman	64	
amburn Silver Mines, Ltd	Camburn			
rank Cassie	Penn Canadian			
olonial Mining Co., Ltd	Colonial	Coleman	- 44	
ilmour and Benson Syndicate	Silver Leaf Dump	66	44	
Chitty and Johns	Ophir Dump		-	
I. J. O'Brien, Ltd	Miller Lake-O'Brien	Gowganda	1	
Perating but Non-Producing Mines-				
Juland Cabalt Minos Yed	Oxford Cobalt	Cillian	66	
Oxford-Cobalt Mines, Ltd		Gillies	44	
letory Silver Mines, Ltd	Victory	Coleman	- 44	
Ruby Operative Cobalt Mines, Ltd	Ruby	Buck		
Dickson Creek (Cobalt) Silver Mines, Ltd.	Dickson Creek	Buck	44	
Howard Collins	Collins		66	
Alphine Silver Mines, Ltd	Alphine Silver		46	
Federal Mining Co	[Federal		Thunder Ba	

The following tables may be useful in comparing this industry with others of the metallic group. In Table 218 the distribution of ownership indicates that, like gold mining in Ontario, the industry was over seventy per cent Canadianowned, at the end of 1921. The capital invested in producing mines totalled

\$30.878,928 for twenty companies, which was proportionally much below the \$28,752,321 for eleven mines in gold mining in the same province. The number of wage-earners averaged (1,074,) of which 208 were surface workers on mining duty, 591 were underground, and 275 were employed in the mills. The average wages paid as computed in Table 222 showed that the miners received \$4.40 per day and mill-workers, \$4.34. The average quantity of ore mined per man in 1921 was 499 tons in this industry as against 868 tons per man in gold-mining in Ontario.

#### Actual Capital Employed, and Distribution of Issued Securities, Silver-Cobalt Mines, 1921

TABLE 218		SHITE	L-Condit .	17	-1		
Number	Actual Capital	Par value o	of Securities	issued by Ir residents	of of	Companies a	nd held by
Companies	Employed	Class of Security	Canada	Great Britain	United   States	Other	Total
			\$	\$	8	\$	\$
			SHIPPING	MINES			
*22	30, 878, 928	Stocks Bonds	36,210,667 45,000	5,859,026	8,647,015 140,000	646,879	51,363,587 185,000
		Total	36, 255, 667	5,859,026	8,787,015	646,879	51,548,587
Percentage of to	otal		70.3%	11.3%	17-1%	1.3%	100%
	0	PERATING	BUT NO	r shippin	G MINES		
7	319,490	Stocks	3,727,219	66, 365	188,552		3,982,136
de le le le			IDLE M	INES			
26	7,791,335	Stocks	12,884,948	167,240	5, 814, 164	26,812	18,893,164
	G	RAND TO	TAL, SILVE	ER-COBALT	MINES		
55	38,989,753	Stocks Bonds	52, 822, 834 45, 000	6,092,631	14,649,731 140,000	673, 691	74, 238, 887 185, 000
		Total	52, 867, 834	6,092,631	14,789,731	673, 691	74, 423, 887

<sup>\*</sup>Of these 22 establishments, six leased their properties to individuals or partnerships while one was operated and owned by an individual.

## Statistics of Silver-Cobalt Mines Producing in 1921

T Arquit 219		
Number of mines		#39
Shafts in operation.	4	25
Average depth in fe	et.	953
Total length of unde	erground workings (miles)	05
Days in operation	Service of the servic	4.292
Ore mined		398, 931
	Male No.	
	Female	2 -
	Salaries	\$ 186,060
Wage-earners -	SurfaceNo.	208 -
	Underground "	591
	Wages.	\$1,040,305

<sup>\*21</sup> mines in operation, 11 making small shipments from stocks of ore mined in other years.

#### Statistics of Mills and Reduction Works Operated at Cobalt during 1921 TABLE 220

Number of mills and reduction works	8
Number of stamps.	300
Number of stamps.  Days in operation.	2.457
Clear concentrated Tons	439, 173
Old trailings treated "	20, 139
Ores evanided or amalgamated	154 277
Old trailings treated "Ores cyanided or amalgamated Fullion recovered Fine ounces	5.499.378
Bullion recovered by direct smelting of nuggets "	3.768
	5, 503, 146
Ballian shinned or sold	
Pallion shipped or sold	4 157 089
Vie valide of building Soft.	1, 144, 300
Salariad employees, Male. No. Female	413
	54, 546
Salaries	14,040
Water-armers	273
Water 19.	3119,839

<sup>\*</sup>This 151, 277 tons is included in the item 130, 173 tons above.

#### Shipments of Ores, Concentrates and Residues from the Cobalt Cam of in 1921

Tance 221

17160	Tons	Gross	Net	Metallic content paid for		aid for
			Value (b)	Silver	Cobalt	Copper
W. Panisha Walking		8	\$	fine ozs.	lb.	ъ,
To Consider Smellers— Cross Consentration	42.1-19 1.726-57		589,712 1,284,477		97,100 145,066	13,929
To Foreign Canalin — Dry. Concentrates	.02 822	35, 181 292, 454			(c)	24,257
Total Stipments— Total ore and concentrates	3, 181 - 76	2,309,356	2, 158, 829	3,294,581	242, 166	38, 186

Gross value means value of the metals paid for before deducting transportation and treatment charges, and includes exchange premium received.

(a) Not value is actual amount received by operator.

Not paid for.

Work Done and Wages Paid.—In Table 222 the detail is given in connection with operating mines only, regarding man-days, work done and wages paid in the mines and mills. The wages paid by producing mines amounted to \$1.440,144. In addition to this amount seven other mines, while not producing ores, carried on considerable development work, for which they paid \$42,531 in wages. The total wages paid was \$1,482,675.

# Time in Operation and Work Done, Operating Silver-Cobalt Mines and Mills, 1921

TABLE 222

		Mine statistic	Mill statistics			
Month	Total man-days work done Tot			Total man-days	Total	
	Surface	Underground	paid	work done	paid	
February March April May Jane July August September October Nevember Decamber	5,715 5,504 5,493 5,723 6,842 5,841 5,496 5,723 5,637 6,289 6,012 5,826	14,165 12,963 10,975 10,027 13,879 14,909 14,749 17,390 20,556 16,226 15,804 15,055	\$ 97,928 91,235 84,915 69,689 80,591 90,942 90,426 98,633 91,875 97,163 95,622 93,817	8,061 6,957 6,534 6,332 7,449 7,779 7,844 8,348 8,191 8,396 8,337 7,774	\$ 38, 957 33, 585 31, 633 26, 652 31, 145 32, 318 32, 857 35, 282 34, 079 35, 938 34, 843 32, 550	
Total	69, 101	176,698	1,082,836	92,002	399,839	
Average Number of Men Employed	234	612		275		

## Fuel Used in Operating Silver-Cobalt Mines and Mills, 1921

Kind	Unit of measure	Quantity	Cost delivered
Coal Amhracite. Bituminous. Coke Gasoline. Fuel oil. Wood. Total.	Short tons "Imp. gals. Cords	523 5,000 48 1,674 76,888 4,153	\$ 8,150 64,007 720 756 10,468 24,072

# Power Employed in Operating Silver-Cobalt Mines and Mills, 1921

Dosedation	Number of units	Total H.P. according to manufacturers rating
Stationary engines (including engines used for hoisting, pumping, etc.)— team. Dil. Electric motors (alternating current) Locomotives (electric). Generators or dynamos— Alternating current	9 10 158 8	1,334 304 270 5,991 29 Total capacity
Direct current.	4	56 K.W. 42 K.W.

	Number	Aver. capacity	Gauge pressure
Air compressors	5	693 cu. ff. per min. free air	90 - 100 lbs.

MINERAL PRODUCTION OF CANADA

# Miscellaneous Expenses Disbursed by Operating Silver-Cobalt Mines and Mills, 1921

TABLE 225

ost of purchased power for mine or nost of all materials and supplies used	nill use I in the mine	or mill		\$ 340,324 £ \$1,063,680
oyalties paid				\$ 34,691
axes—				\$ 28,833
Municipal				\$ 31,315
Federal				\$ 139,647
ll other sundry expenses				\$ 160,968

### THE SILVER-LEAD-ZINC MINING AND MILLING INDUSTRY

The production of lead and zine in Canada has been derived in the main from the large silver-lead-zine deposits of British Columbia. During 1921, fifty-four different mines in this province made shipments varying in weight from the small sample lot of a ton or so to as much as 29,000 tons. Quebec, Ontario and the Yukon were each represented by one shipping mine. The total for the Dominion was therefore, 57 shipping mines.

Quebec—The Tetreault Mine was operated under lease by the Zine Company, Limited. This property is situated in the county of Portneuf and township of Montauban. The ore deposit is a complex lead-zine ore carrying gold and silver in small quantities. The ore is milled and concentrated at the mine, the lead concentrates being generally exported while the zine concentrates receive a slight roast and are then run over magnetic separators to remove the iron. Formerly these zine concentrates were treated in the zine oxide plant belonging to the company but in 1921 this plant was partially destroyed by fire and all zine concentrates since produced have been stored.

Ontario—The Kingdon Mine of the Kingdon Mining, Smelting and Manufacturing Company is situated in Carleton County, Fitzroy Township, near Galetta, Ontario. The ore is a series of calcite veins carrying galena. There is a little zine-blende present and a very small amount of silver which is not recovered. The ore is milled, concentrated and smelted on the property and the pig lead produced is of a very pure grade.

British Columbia—The fifty-four shippers, a list of which may be found below, are situated mainly in the East and West Kootenays, and produce a variety of ores. The Sullivan Mine, situated near Kimberly, and owned by the Consolidated Mining and Smelting Company, and which is one of the largest zine mines in the world, produces a zine-lead ore of which the chief component is zinc. Other deposits are higher in lead and earry silver, and grade down to dry silver ores which are low in lead. The industry is one in which the individual operator has a field for his activities; eighteen individuals owning twenty-one mines, produced and sold ore in 1921 as well as eleven partnerships operating twelve properties. There were sixteen incorporated companies with twenty mines shipping. Most of the capital employed was paid out by the incorporated companies, their investment amounting to sixteen millions of dollars as compared with one million (nearly) by the individual owners and four hundred thousand dollars, by partnerships. The company mines are owned principally by Canadians, as will be observed in the section of the table on distribution of ownership, which shows the par value and distribution of the issued stocks, bonds, etc., of the incorporated companies.

Yukon Territory—During recent years considerable development work has been carried on in the lead-producing mines of the Yukon Territory. In 1913 and 1914 small productions were reported. In 1915, 1916 and 1917 production was considerably increased and extensive work was done in the Mayo area about 125 miles due east of Dawson City. Considerable shipments of very rich silver-lead ore were made in 1915 and 1916 from the Silver King property on Galena Creek. Smaller shipments occurred in 1917 and 1918, and in 1921 a shipment of 2,110 tons was made by the Yukon Gold Company to the Selby Smelter in San Francisco.

The most important deposits were found over a distance of some 60 miles on six isolated and separate hills known as Galena Hill, Mount Haldane, Keno Hill, Stand-To Mountain, Rambler Hill and Mount Cameron. Of these, the

most extensive development work has been done on Keno Hill.

Some of the more important mines and claims are Keno Hill, Ltd. (Yukon Gold Co.), the F. W. Bradley interests, Slate Creek Mining Co., on Keno Hill; Silver King Mine on Galena Hill, Silver Lead Mining Co., Mount Haldane; Shamrock Group on Keno Hill; Silver Basin Group, also on Keno Hill. Other important claims are located on Rambler Hill, Stand-To Mountain and Mount Cameron.

The production from this area has been handicapped by lack of transportation facilities, and the consequent high cost of development and supplies. The ore to be shipped is hauled during the winter a distance of 42 miles to Mayo Landing. Upon the opening of navigation the bagged ore is transported in barges down the Stewart to the Yukon River where it is transferred to larger boats and shipped to St. Michael to be there transferred to ocean freighters.

The Mayo Valley Railway, Limited, has been granted a Dominion Charter for the purpose of building a fifty-mile line along the Stewart and Mayo Rivers. The completion of such a road would help considerably in reducing costs. Complete development would of course be obtained by linking up the mining

area with the White Horse Pass and Yukon Route at Whitehorse.

With the exception of those in the Yukon and Ontario, the lead-zinc deposits are a more or less complex mixture of galena and zinc-blende carrying silver and gold in varying amounts. These ores are generally milled and concentrated where necessary to separate the zine sulphide or blende from the In the past the absence of a means for securing treatment of the zine ores and concentrates in Canada has always been a handicap especially in British Columbia. Formerly zinc ores were shipped at heavy cost to United States zinc smelters where operators were recompensed for the zinc contents, but lost valuable amounts of silver and were penalized for any lead contained in the shipped ores. On the other hand, the presence of zinc in a lead ore makes it refractory when treated for lead and as a result the mine operators suffered a penalty per unit of zinc in their lead ores. Under these conditions the industry in 1921 and prior to that year, experienced many difficulties, which at the time of writing were on a fair way to being entirely eliminated. In recent years the Consolidated Mining and Smelting Company has so improved and developed the electrolytic process for the treatment of zinc ores that it can now offer a schedule of smelter rates under which the mine owner will be enabled to market zine ores and concentrates and to receive payment for the precious metal contents in addition to the zinc. zinc contained in lead ores, or concentrates may continue to be a loss, but the penalty for zinc in lead ores will be lowered and the lead-zinc industry will benefit materially through the ability to market zine ores and concentrates in Canada.

NUMBER OF OPERATORS, NUMBER OF MINES, CAPITAL INVESTED AND VALUE OF PRODUCT IN THE SILVER-LEAD-ZING INDUSTRY IN CANADA IN 1921

In Table 226 there is tabulated the character of ownership and the value of the product of each group.

As mentioned above, British Columbia has 54 of the 57 shipping mines in which there was invested at the end of 1921 over 93 per cent of the total for Canada. The net value shown is the value of the ore shipped based on the settlement assay and less all charges for freight and treatment. In the section showing "Distribution of Ownership" of incorporated companies it will be seen that over 75 per cent of the issued stocks, bonds, etc., were Canadian-owned in December, 1921. These companies operated 24 shipping mines and it is probable that if the remaining 33 mines operated by individuals and partner-thips were included the percentage of the investment in the lead-zinc industry owned by Canadians would be even higher.

This table gives similar data for mines being developed, but which did not ship ore in 1921 and table (c) covers some 65 idle mines from which returns were received. The total number of lead-zinc mines was therefore 133 in which \$27,436,645 actual capital was invested. The total par value of the issued stocks, bonds and other securities was \$39,512,756 of which over 66 per cent was owned in Canada.

### Net Value of Shipments from, and Distribution of Ownership in, the Silver-Lead-Ziuc Mining Industry in Canada, 1921

TABLE 226

Province    Par Value of Securities Issued by Incorporated Countries Indication of ore shipped   Par Value of Securities Issued by Incorporated Countries Indication	ompanies ed
of ore shipped Security Canada Britain States Countrie	
(a) CHIPPING MINES	s Total
Quebec, Ontario and Yukon. Stocks 900,000	1,390,000
Other Securities Con and Account Accou	1 000 000
Total	
British Columbia. Stocks   14, 203, 227   4, 316   4, 436, 217   2, 603, 2   Bonds   Other	3,050,000
Securities	
Total	
Total for Canada Stocks 15, 103, 227 4, 316 4, 926, 217 2, 603, 24 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	3,050,000
Total. 2, 108, 053 18, 103, 227 4, 316 4, 976, 217 2, 603, 21	5 25,687,015
(b) OPERATING, BUT NOT SHIPPING MINES	0.001.001
Quebec         Stocks         2,215,055         6,550           Bonds         Other           Securities         Other	2,221,605
Total	. 2,221,605
British Columbia. Stocks Bonds 0ther 2,445,201 12,500	. 12,500
Securities	. 3,280,745
Total for Canada. Stocks 3,037,799 300 2,451,751	-
Bonds 12,500	. 12,500
Securities 3,037,799 300 2,464,251	5,502,350
(c) IDLE MINES British Columbia.  Stocks Bonds Other Securities Stocks 4,902,272 611,697 2,724,610 20,000 20,000 8,433	. 35,000
	0 8,323,391
Total Stocks 4,902,272 611,697 2,724,610 30  Total for Canada Bonds 15,000 20,000 20,000 Securities Securities	. 35,000
Total 4,958,351 611,697 2,753,043 30	0 8,323,391
Operating (development only). 3,037,799 300 2,464,251 300 2,464,251	5 25,687,015 5,502,350 0 8,323,391
Grand Total. 2,108,053 26,099,377 616,313 10,193,511 2,603,55	5 39, 512, 756

## Mines Shipping Silver-Lead-Zinc Ore during 1921 in British Columbia

Name of Company	Address	Name of Mines
Name of Company	Address	Name of Mines
INCORPORATED COMPANIES		
Consolidated Mining & Smelting Co., Ltd	Trail, B.C	
		Highland
Marsh Mines Developing Co., Ltd	Spokane, Wash., 617 Peyton Bldg.	No. 1 March
Providence Mining Co., Ltd.	Box 446, Greenwood, B.C	Providence
Providence Mining Co., Ltd	Box 176. Pentieton, B.C	Sally Group
Utica Mines, Ltd. Standard Silver Lead Mg. Co	Kaslo, B.C. Silverton, B.C. Spokane, Wash., Box 1772	Ulica
Silversmith Mines, Ltd	Spokane, Wash Box 1772	Slocan Star
Taylor Engineering Co	Vietoria, B.C	Dolly Vardon
(active for a short time on development		
work.)	N D D C	63
Rosebery-Surprise Mg. Co., Ltd.	New Denver, B.C	Surprise
Rambler-Caribou Mines, Ltd	Three Forks, B.C	Rambler Caribou
North Star Mg. Co. Ltd. (Thompson and		
McKinney, lease). New Coundian Metal Co., Ltd	Kaslo, B.CRiondel, B.C	North Star
Krao-Silver Lead Mg. Co., Ltd	Kaslo, B.C.	Krao
Victor Silver Leaf Mg. Co., Ltd., operated		
Victor Silver Leaf Mg. Co., Ltd., operated by Ningara Operating Co. (lessees)	Spokane, Wash., 732 W. 5th Ave	
Florence Silver Mg. Co., Ltd	Spokane, Wash., 517 Hutton Bldg.	Florence
Echo Silver Lead Mg. Co	Spokane, Wash., 27 E. Boone Ave. Ainsworth, B.C.	Echo Little Mannie
	Amsworth, D.C	Little manne
MINING PARTNERSHIPS		
Green Bros. and Ryan	Kaslo, B.C.	Sliver Bell Mine
Ottawa Mining and Milling Co. McIntosh and Crane.	Slocan City, B.C	Ottawa
I McDouggle & Co (operand by two lessons)	Aingmonth R.C.	Spokano Trinkat
J. McDougah & Co. (operared by two lessees) Silver Standard Mining Co Black Prince and Two Friends Syndicate	Vancouver, B.C., 506 Winch Bldg.	Silver Standard
Black Prince and Two Friends Syndicate	Vancouver, B.C., 502 North West	
	I Bizier	Hunck Frince
The Whitewater Mining Co	Kaslo, B.C	Winterwater Contain Francisco
French and Bourne (operated by three	beaverden, b.C	Casion Praction
lessees)	Sandon, B.C.	Majestic
Henry and Curry	Ainsworth, B.C	Vialet
English Brothers	Kaslo, B.C	Helen
	IKasio, B.C	Neno
INDIVIDUAL OWNERS		
Clarence Cunningham	Alamo, B.C	Queen Bess
		Alamo Sublet to Idaho   lessees.
James Anderson (operated by 3 lessees)	Kaslo, B.C., Box 122	Ferguson (Silver Cup
		and Nottin I
Jas. Anderson.  If. E. Forster.  G. M. Burrett (uncertify by Alexand)	Kasio, B.C., Box 122	Millio Mook
G. M. Barrett (operated by 4 lessees)	Benverdell, B.C.	Kakome
A. W. McCune (operated by lessees)	Sandon, B.C.	Freddy Lee
A. W. McCune (operated by lessees). A. W. McCune (operated by lessees). D. B. O'Neail.	Ainsworth, B.C	Skyline
D. B. O Neath	Sloven City, B.C	L. T. Group
K. E. Zimmerman J. N. Patton	Silverton B.C.	Wellington
Chas. G. Olson (operated by 2 lessees)	Ainsworth, B.C.	Grant Mine
Robert Cunning	Sandon B.C.	Last Chance
Edward Maloney	Penticton, B.C.	Highland Chief
J. H. Chisholm Eric Johnson	Kaslo, B.C.	Monawk Joseph Bluckind
W. G. Clark	Kaslo, B.C	Chambers Groun
H. T. Twigg	Enderby, B.C	Redress
10. Randolph Bruce	Invermere, B.C	Paradise
M. J. Byrne	ISandon, B.C., Box 167	Gem
H. Clever	New Denver, D.C	mony riugites

## TONNAGE MINED, UNDERGROUND DEVELOPMENT AND ORES CONCENTRATED

Of the 72 operating mines in the lead-zinc industry, 57 shipped ore while 15 carried on development work only (see Table 227). British Columbia claimed 67 of the properties, Quebec three, while Ontario and the Yukon each reported one active mine.

The total ore mined in Canada was 390,073 tons. In British Columbia 54 mines produced 337,406 tons for which the salaries and wages amounted to \$712,523. Some 27 lessees sublet mines or parts of mines during 1921 and

no accounting of wages paid out by them could be made.

In Table 228 the corresponding data relating to concentrating mills are shown. There has been excluded the large concentrator operated at Trail by the Consolidated Mining and Smelting Company where during the year a total of 304,418 tons of zinc-lead ores was treated from which 104,950 tons of zinc concentrates and 43,239 tons of lead concentrates were produced. The data for this mill are included with the metallurgical works in a later section.

### Ore Mined and Underground Development in Silver-Lead-Zinc Mines Operating, 1921

Table 227

Province	No. of Mines	Shafts in operation	Lengths of Adits or Tunnels	Total Length of Underground Workings	Ore Mined
Producing— Quebec, Ontario, Yukon—Total British Columbia—Total	3 54	3 8	feet 57,650	feet 9,543 290,312	tons 52,667 337,406
Non-producing— Quebec, British Columbia—Total	15	3	10,846	32,363	
Dominion Total	72	14	68,496	332,218	390,073

## Ore Milled by Silver-Lead-Zinc Mines Operating, 1921

TABLE 228

Province	No. of mills	Total capacity in 24 hours	Ore milled	Concentrates produced	
			tons	tons	
Quebec and Ontario	2	450	50,557	†2,315	
*British Columbia	6	900	9,543	1,379	
Total for Canada,	8	1,350	60, 100	3,694	

<sup>\*</sup>Does not include concentrator operated by Consolidated Mining and Smelting Company of Canada at Trail.

†Lead concentrates only.

#### SHIPMENTS AND DESTINATION OF CANADIAN ORES AND CONCENTRATES DURING 1921

As shown in Tables 229 and 230, the silver-lead-zinc mines of Canada shipped in 1921 a total of 312,758 tons of ore and concentrates having a net value of \$2,177.053 to the mines, of which value over 89 per cent or \$1,950,553 came from British Columbia.

Of the total quantity, 308,322 tons was shipped to Canadian smelters and 4,436 tons to smelters in the United States.

Products Shipped by Silver-Lead-Zinc Mines in Canada, 1921

TABLE 229								
	No. of		Quantity	Net value at	Total m	netal conter settleme	nta as deter nt assay	rained by
	Mines	Product shipped	anipped	shipped shipping point	Gold	Silver	Lead	Zinc
Quebec, Ontario and Yukon	3	Lead ore	tons 2,110 2,315			ogs. 378,261 37,895	lb. 2,472,615 3,422,090	
		Total	4,425	226,500	376	415,156	5,894,705	
British Columbia	54	tLead ore.  *Lead concentrates.  Zinc ore.  Zinc concentrates  Dry ore.	9,415 1,419 297,241 165 93	73,636 1,486,597	2	32,725 839,624 17,218		6,980 98,675,414 123,679
		Total	308,333	1,950,553	1,100	1,441.273	62,123,001	99,093,447
Total for Canada	57		312,758	2,177.053	1,476	1,857,429	68,017,706	99,092,447

theludes 5,506 tons of silver ore (Dolly Vardon Mine). \*Includes 44 tons of silver concentrates.

## Destination of Shipments from Silver-Lead-Zinc Mines in Canada, 1921

Product shipped	Tons	Net value value at	Tota		ontents as d lement Assa	
Product supped	shipped	shipping point	Gold	Silver	Lead	Zinc
TO CANADIAN SMELTERS -NUMBER OF MINES SHIPPING, 50		\$	028.	ozs.	lb.	lb.
Lead Ore	8,641 2,349 297,211 28 93	295, 530 113, 241 1, 486, 134 1, 952 7, 024	1,063.0 1.6 0.3 8.0 16.8	433,364 28,189 838,759 3,875 11,213	1,595,278 3,397,895 58,476,369 4,634 3,239	282, 294 98, 652, 785 11, 167
Total	308,322	1,903,881	1,090	1,315,400	63,477,415	98,946,246
TO UNITED STATES SMELTERS—NUMBER OF MINES SHIPPING, 12 Lead Ore	2,884	169,647	9.9	485,390	3,017,046	4,080
Lead Concentrates. Zinc Ore. Zinc Concentrates. Dry Ore.	1,385 30 137	92,895 463 10,167	376.2	42,431 865 13,343	1,507,397	6,980 22,629 112,512
Total	4,436	273,172	386 - 1	542,029	4,540,291	146, 201

SALARIED EMPLOYEES AND SALARIES PAID, AVERAGE NUMBER OF WAGE-EARNERS WORK PERFORMED AND WAGES PAID

Table 231 classifies the salaried officials in the producing and non-producing groups. Of the 71 persons employed throughout the Dominion as managers, technical employees, and clerks etc. 63 were employed on mine staffs while 8 were mainly engaged in connection with milling. No females were reported as employed. In Table 232 the corresponding data are shown for the wage-earners, both in mines and mills.

## Salaried Employees and Salaries Paid in Silver-Lead-Zinc Mines and Mills in Canada, 1921

TABLE 231

	On Mino	Pay Roll	On Mill	Pay-Roll		for Mine Mill
	No. Male	Salaries Paid	No. Male	Salaries Paid	No. Male	Salaries Paid
Producing Mines and Mills		8		\$		\$
Three Mines in Quebec, Ontario, Yukon— Managers and Superintendents	5	19,750	2	2,487	7	22, 237
Technical Employees	3 7	4,685 8,210	4	2,400	3	4,685
		-				10,610
Total	15	32,645	6	4,887	21	37,532
Fifty-four Mines in British Columbia— Managers and Superintendents	17	40,649	2	3,314	19	43,963
Technical Employees	12	21,201		0,017	12	21,201
Clerks, Stenographers, etc	13	15,565			13	15,565
Total	42	77,415	2	3,314	44	80,729
Fifty-seven Mines in Canada— Managers and Superintendents. Technical Employees. Clerks, Stenographers, etc. Total.	22 15 20 57	60,399 25,886 23,775	4 8	5,801 2,400 8,201	26 15 24 65	66, 200 25, 886 26, 175
Non-Producing Mines and Mills Thirteen in British Columbia, Two in Quebec—						
Managers and Superintendents	5	5,225			5	5,225
Technical Employees	1	60		,,,,,,,,,,,	1	60
Total	6	5,285			6	5,285
All Operating Mines and Mills Three in Quebec— One in Ontario— Sixty-seven in British Columbia— One in Yukon— Seventy-two in Canada— Managers and Superintendents	27	65,624	4	5,801	31	71,425
Technical Employees	15	25,886			15	25,886
Clerks, Stenographers, etc	21	23,835	4	2,400	25	26,235
Total	63	115,345	8	8,201	71	123,546

### Average Number of Wage-earners, Work Done and Wages Paid in Silver-Lead-Zinc Mines and Mills, 1921

TABLE 232

Province	No. of		e No. of Earners	Man-day done	Winner	
r rovince	Mines	Surface	Under- ground	Surface	Under- ground	Wages
Producing Mines	\					\$
Quebec Ontario	3	25	115	7,796	26,936	148.559
Yukon British Columbia	54	187	294	54,676	79,069	631,794
Total	57	212	409	62,472	106,005	780,353
Non-Producing Mines Quebec British Columbia	2 13	} 17	23	2,425	3,013	23.080
Total	1.5	17	23	2,425	3,013	23,080
Operating Mills Quebec. Ontario British Columbia.	1 1 6	} 54		8,727		37,592
Total for Canada	72 mines 8 mills	} 283	432	73,624	109,018	841,025

### FUEL USED, POWER AND MACHINERY INSTALLED

In Table 233 the quantities and values of the different grades of fuel used are shown. Of the total fuel cost of \$78.833 almost half or \$38,545 was incurred by some five properties in Ontario, Quebec and the Yukon. The most costly item was wood for which as much as \$20 per cord was paid in the Yukon. The fuel cost in British Columbia was small, due to cheap water-power available.

Table 234 shows the number of boilers, engines and waterwheels installed, with data regarding motors and generators giving the manufacturers' rating.

In Table 235 is tabulated miscellaneous expenses.

Fuel Used in all Operating Silver-Lead-Zinc Mines and Mills, 1921  $_{\rm TABLE~233}$ 

Kind	Unit of		Ontario, kon	British Co	olumbia	Total Cans	
Kilid	Measure	Quantity	Value	Quantity	Value	Quantity	Value
Coal—			\$		\$		\$
Anthraeite	Short Tons			43	441	43	44
Bituminous	64			4, 155	31,749	4,155	31.74
Lignite	64	725	5.045	110 34	1,145	110 759	1.14 5.45
Jasoline	Imp. Gals.		1,000	2,000	1,000	3.000	2 00
Fuel Oil	4.6			4,600	1,704	4,600	1 70
Wood,	Cord	2.140	32,990	595	3,350	2,595	36.34
Total			39,035		39.798		78.83

Power Equipment in all Operating Silver-Lead-Zine Mines, 1921
Table 234

		Ontario and Territory	British	Columbia	Total for Canada		
Description	No. of Total Rated H.P.		No. of Total Units Rated H.P		No. of Units	Total Rated H.P.	
Boilers— Fired by hand	4	275	10	925	14	1,200	
Stationary engines—(including engines used for hoisting, pumping, etc.)— Steam	3	100	7 1 2	858 60 40	10 1 3	95) 60 4)	
Hydraulic turbines or water wheels			36	4,188	36	4,18	
Electric motors— Alternating current Direct current			15 14	610 617	43 14	1.54 61	
Locomotives— Electric			6	150 20	6	150 21	
Generators or dynamos— Alternating current Direct current	1 1	K.W. 75 5	7 8	K.W. 855 453	8 9	K.W. 930 458	
†Air compressors	5	3,035	15	2,444	20	5,479	

†Total capacity average M. cu. ft. per min. free air.

# Miscellaneous Expenses Incurred by all Operating Silver-Lead-Zinc Mines and Mills, 1921

TABLE 235

	Quebec, Ontario, Yukon.	British Columbia	Tot l for Canada
Cost of purchased power for mine or mill use.  Cost of all materials and supplies used in the mine or mill.  Royalties paid.	23,150 100	\$ 262,774 17,762	\$ 12,030 285,924 17,862
Municipal tax. Provincial tax. Federal tax. All other sundry expenses.	2,267 1,065	30,983 3,687 94,646	33, 250 3, 687 95, 711
Total miscellaneous expenses	39,212	409,867	449, 079

#### IRON ORE MINING

During 1921 the production and shipments of iron ore fell below those of any of the past 20 years. The detail of the shipments is given in Part One under Iron Ore.

The twenty iron blast furnaces of Canada, 12 of which are located in Ontario and 8 in Nova Scotia are dependent almost entirely on imported ores. This is due to the lack of such high grade ores in Canada as are available in the economic deposits of the United States.

The shipping mines in 1921 were the Magpie Mine, Algoma Steel Corporation, Sault Ste Marie, Ontario; Moose Mountain Mine, Moose Mountain, Limited, Sellwood, Ontario; Wallbridge Mine, T. Wallbridge, Madoc, Ontario; and the Hope Mine, Pacific Coast Steel Company, Texada Island, British Columbia.

The capital actually invested by these companies was reported to be as follows:—

## Capital Invested in Mines Producing Iron Ore in Canada, 1921

Table 236	
Lands, buildings, plant machinery and tools  Materials on hand  Cash and trading accounts and bills receivable	354,808
Total	4,604,04x

Respecting the issued stocks, bonds and other securities of these companies, only those of Messrs. Moose Mountain, Limited referred exclusively to mining. Since the Algoma Steel Corporation's main enterprise was the production of pig iron and steel products, the proportion of capital stock used for mining purposes would be small, and no separation could be made.

There was no iron ore mined in Nova Scotia during the period. The Nova Scotia Steel and Coal Company and the Dominion Iron and Steel Company imported hematite ores from Wabana, Conception Bay, Newfoundland, the

detail of which is given in the section on iron ore in Part One.

The following companies reported as idle in 1921 have in some cases carried on considerable development work, especially during the war, when shipments of ore were made.

Name of Company	Mine	Location
Quebec Baie St. Paul Titanic Iron Ore Co Manitou Iron Manufacturing Co Bristol Iron Company		St. Urbain, Charlebois Co. Bristol, Pontiae County.
Nova Scatia Canada Iron Foundries Ltd		Annapolis, N.S., and Bath- urst, N.B.
Ontario Atikokan Iron Co. L(d	Algoma	Atikokan, Ontario. Algoma District. Township 28, Range 27, Nipigon Reserve (Jack Pine, Ont.)
Tivani Electric Steel Co	Orton	Tudor Tp., Hastings Co.
Puget Sound Iron Co Hematite Mining Co., Ltd North Pacific Iron Mines Ltd	Belchor	Nanaimo Mining Division.

### Distribution of Ownership of Securities Issued by Joint Stock Companies Controlling Iron Mines in Canada, 1921\*

Table 237

Security	Canada	Great Britain	United States	Others	Total
Stocks. Bonds.	4,685,270 2,200,000	\$ 3,425,040 549,693	\$ 3,785,447 1,009,000	\$ 31,540	\$ 11.927,297 3.758,693
Total	6,885,270	3,974,733	4,794,447	31,540	15,685,990

<sup>\*</sup>In this Table the data given, cover all operating and idle joint stock companies controlling iron mining properties except the Loughboro Mining Company which is included under Mica Mining, and the Algoma Steel Corporation which is included in the survey of the iron and steel smelting industry. Includes shares of Moose Mountain Ltd.

During 1921 some 59,509 tons of iron ore valued at \$230,164 was shipped from Canadian mines. Of this amount only 43,208 tons was mined during the year and the balance represented ores mined in previous years. The average number of men employed was 71 and wages paid amounted to \$68,606 during the period.

### Capital Invested in Idle Iron Mines in Canada during 1921

Table 238	
Lands, buildings, plant machinery and tools	
Cost of all materials supplies ore on dumps	
Cash, trading and operating accounts and bills receivable	\$ 145,447
Total	\$6,428,482

The majority of the prime movers installed in all mines were electrically driven, and some 6,000 h.p. was the maximum which could be derived. Boilers installed totalled 6 with a combined rating of 750 h.p.

### Power Employed in all Iron Mines in Canada, 1921

TABLE 239		
	Number of Units	Total H.P. according to manufacturers' rating
Electric Motors— Alternating current. Direct current.	85 6	5, 563 460
Generators or dynamos— Direct current	5	
Air compressors	3	Total capacity 1,400 cu. ft. per min., free air

### METALLURGY

As mentioned in the section on Mining and Milling, it was found impossible in several instances to draw any line of demarcation between mining proper, and those operations which were earried on above ground. Many establishments give treatment of one kind or another to the crude ore after it is mined and it has been the custom to consider this preparation for market or for further treatment, as part of the mining operations. As examples, there were mentioned the recovery of gold bullion in Porcupine, and in the milling and reduction operations carried on in the Cobalt district. In these cases the manipulation of the ore after it leaves the mine is so interwoven with the business of mining as to be inseparable.

In a number of instances, however, it has been possible to obtain certain statistics regarding smelting and refining plants in conjunction with mines operated, and the present section has been designed to present in a correlated manner, the principal data furnished by these concerns and by similar plants operated independently of mines, in which the reduction of ores either by fire or by electricity was carried on for the production of the non-ferrous metals or compounds of them.

In 1921, there were in Canada eleven companies of this sort which in normal times operated fourteen plants. Most of the smelting establishments eurtailed their operations and in some cases closed down entirely, e.g. the nickel-copper smelters and refineries.

The zinc oxide plant of the Canadian Zinc Oxide Company was idle during most of the period and was partially destroyed by fire in August, 1921. The Antimony Smelting Company in New Brunswick was also idle throughout the twelve months.

The names of the companies with their principal products are as follows:-

#### BRITISH COLUMBIA

The Consolidated Mining and Smelting Company of Canada, Ltd., Trail, B.C., operating many mines in addition to a large smelter and refineries producing gold, silver, lead, copper, copper sulphate, and zine;

The Granby Consolidated Mining, Smelting and Power Company, Ltd., Anyox, B.C., operating mines and a copper smelter and producing copper, gold and silver;

#### ONTARIO

The International Nickel Company of Canada Ltd., Copper Cliff, Out. operating several mines and a smelter near Copper Cliff and a refinery for matte at Port Colborne, Ontario, producing nickel and compounds of nickel, copper, monel metal and small amounts of the precious metals such as gold, silver, platinum and others of the platinum group;

The Mond Nickel Company operating mines and a smelter at Coniston, Ontario, but shipping the smelter matte to Wales for refining;

The British America Nickel Corporation, Limited, operating mines and a smelter near Sudbury and refining the matte at Deschenes, Que., producing nickel and nickel compounds, copper and some precious metals;

The Coniagas Reduction Company operating a smelter in St. Catharines. Ontario, and producing silver bullion, the metals and oxides of cobalt and nickel, metallic arsenic, white arsenic and copper sulphate;

The Deloro Smelting and Refining Company operating at Deloro, Ontario, smelting cobalt ores and producing silver bullion, metals and oxides of cobalt and nickel, white arsenic, the alloy stellite and insecticides;

Ontario Smelters and Refiners Limited, Chippawa, Ontario, which was a consolidation of the Metals Chemicals, Limited, of Welland, and The Standard Smelting and Refining Company of Chippawa. This organization came into existence early in 1920, and produced silver bullion and many chemical compounds of nickel, cobalt, arsenic, etc., and insecticides;

The Kingdon Mining, Smelting and Manufacturing Company, Galetta, Ont., producing a pig lead from galena ores;

The Canadian Zinc Products Company operated their zine oxide plant for a short time during the year, but it was partially destroyed by fire in August, 1921:

#### NEW BRUNSWICK

The North American Antimony Smelting Company, Lake George, producing antimony regulus (idle). The company has been reorganized and is now known as the Antimony Products Corporation.

Smelting and reduction works treating only foreign ores, such as the Electro Tin Syndicate, Brantford, Ontario, (idle in 1921); the Shawinigan Electro Metals Co., Shawinigan Falls, P.Q. (idle in 1921), and the Northern Aluminium Co., Shawinigan Falls, P.Q., and all furnaces used in recovering the non-ferrous metals from scrap have been excluded as their activities have been reviewed in the report on the manufactures from non-ferrous metals.

As it is not permitted to publish statistics relating to an industry unless it is represented by three or more companies, it was necessary in some cases to include in one class, plants of different kinds, for instance, copper smelters

and refineries with lead and zinc plants.

The groups selected were: The nickel-copper smelting and refining group, comprising three companies which operated three smelting establishments, all in Ontario, and two refineries one of which was in Ontario and the other in Quebec; the silver-cobalt smelters and refineries including three companies engaged in treating silver ores from the Cobalt camp; and the copper-lead-zinc smelters and refineries in which three companies were active, two being in British Columbia and one in Ontario.

It might be pointed out that the tables showing distribution of ownership and capital invested will in part duplicate information already given in the mining section since there was no known basis on which the amounts to be allocated to mining or to metallurgy could be calculated. The data given on nickel-copper smelting and refining, which have already been included in the mining section, are here given separately. Apart from the points just mentioned.

the data following relate to the metallurgical industry only.

The distribution of ownership in this industry and the percentage of the total par value of the issued securities held in each country are shown in Table 240. In Table 241, the actual capital invested has been compiled. By applying the percentages shown in Table 240 to the respective totals given in Table 241 as invested in each of the three industries, an approximate estimate may be made of the actual foreign capital invested. These, when totalled show (see Table 242) the ownership of the non-ferrous metallurgical industries in Canada.

Distribution of Ownership of the Securities Issued by the Incorporated Companies operating in the Metallurgical Industry in Canada, 1921

Table 240

Security	Par Va	Total			
security	Canada	Great Britain	United States		
Nickel-Copper Smelters and Refineries, three companies— Stocks. Bonds. Other Securities.		\$24,021,606 \$19,218,823 66	\$ 754	\$ 306,152	\$ 73,151,602 \$ 22,546,665 \$ 4,561,200
Total	\$ 5, 158, 761	\$43,240.495	\$45,050,454	\$ 6,809,757	\$100, 259, 467
Percentage of Total	5 · 145	43 · 128	44.9	6.79	100
Silver-Cobalt Smelters, three companies— Stocks Bonds			\$ \$5,025 \$ 20,100		\$ 1,938,530 \$ 215,000
Total	\$ 2,128,405		\$ 25.125		\$ 2,153,530
Percentage of Total	98-83		1.27		100
Copper, Lead, Zinc, three companies— Stocks. Bonds			\$12,000,420 \$ 3,991,400		\$ 26,284,120 \$ 6,991,400
Total	\$17,283,700		\$16,491,820		\$ 33,275.520
Percentage of Total	51		49		100
Total—Stocks.	\$17,428,891	\$24,021,606	\$57 555 145	\$ 2 868 610	\$101 874 959
Bonds. Other Securities.		\$19,218,823		\$ 306,152	\$ 29,753,065 \$ 4,561,200
Tatal	\$24.570,866	\$43,240,495	\$61,567,399	\$ 6,809,757	\$136,188,517
Percentage of Total	18-1	31.7	45 - 2	5.0	100

The Canada Zine Company and the North American Antimony Smelting Company were idle throughout 1921 and are not included in the above table or any of the following.

Capital Actually Employed in the Metallurgical Plants of Canada, 1921
Table 241

	Nickel- Copper Smelters and Refineries	Silver- Cobalt Smelters	Copper, Lead and Zinc Smelters and Refineries	Total
	\$	8	8	\$
Lands, buildings, plant machinery and tools Materials on hand, supplies, finished products		1,433,442	31,823,524	55, 560, 551
and ore on dump	10,467,385	2,105,786	9,234,445	21,807,616
bills receivable		444,096	812,092	5,318,778
Total	36,833,560	3,983,324	41,870,061	82,686,945

## Actual Investment in the Metallurgical Industry in Canada by Residents of the Countries Indicated\*

	24	

	Canada	Great Britain	United States	Others	Total	
No. 1 and 1	\$	8	\$	• \$	8	
Nickel-Copper Silver smelters Copper-lead-zine	1,895,087 3,935,524 21,353,731	15,885,578	16,550,423 47,800 20,516,330	2,502,472	36,833,560 3,983,324 41,870,061	
Total	27, 184, 342	15,885,578	37, 114, 553	2,502,472	82,686,945	
Per cent of total	32.87%	19.21%	44.88%	3.04%	100-00%	

<sup>\*</sup> The amounts given in this table were calculated by applying the percentages given in Table 240 to the totals given in Table 241.

In Tables 243 and 244 the total salaries and wages paid in the Canadian metallurgical industry have been shown as well as a comparison between the amount of work done in 1921 by the different groups.

The total salaries paid in this industry amounted to \$737,657 of which the highest amount or \$393,606 was paid to 156 officials in the nickel-copper group. The copper, lead and zinc, and the silver-cobalt-nickel groups followed in order with \$232,936 and \$111,115, respectively.

The total amount paid to wage-earners in the same plants was \$3,669,300 but the greatest amount to an individual group was in the copper, lead and zinc group in which \$1,988,711 was paid for 445,279 shifts; nickel-copper followed with \$1,355,123 paid for 310,683 shifts; and the silver-cobalt-nickel group paid \$325,466 for 76,724 shifts. From these figures the average daily rate was computed as \$4,466 per shift in the nickel-copper group, \$4,361 in the combined copper, lead and zinc group, and \$4,242 in the silver-cobalt-nickel metallurgical works.

By comparing the ratio or proportion of salaries to wages, it is found that the lowest occurred in the copper, lead and zinc group and was as \$1 is to \$8.537; for the nickel-copper group it was as \$1 is to \$3.442, and for the silver-cobalt-nickel group the salaries amounted to an even higher ratio namely, as \$1 is to \$2.929. It would appear that, proportionally, the number of highly skilled technical employees in the latter group was greater than in any other.

# Salaried Employees in the Metallurgical Industry in Canada, 1921

	On 8	Smelter I	Pay-roll	On F	On Refinery Pay-roll		
Group and Class of Employees		ber of loyees	Total Salaries	Number of Employees		Total Salaries	
	Male	Female	L'alai les	Male	Female	DHIBITES	
Nickel-Copper Smelters and Refineries (Including 3 smelters and 2 refineries)			\$			\$	
Superintendents and managers	9		61,590	12		49,798	
draughtsmen, etc	16 49	4	50,920 130,280	29 30	7	70,882 30,136	
Fotal	74	4	242,790	71	7	150,816	
Since Capalt-Nickel Smelters and Refineries Combined (Including 3 companies, Smelters and Refiner- ies combined)							
Superintendents and managers	6		27,133				
dirangitsmen, etc	39	1	1,285 82,697				
Total	46	1	111,115				
Capper-Lead-Zinc Smelters and Refineries (Including 3 companies)							
Superintendents and managers	22		76,584	4		13,115	
draughtsmen, etc	30 41		54,592 60,654	12 2	i	23,836 4,155	
Total	93		191,830	18	1	41,106	
All the Metallurgical Groups							
Superintendents and managers	. 37		165,307	16		62,913	
disamintsmen, etc	47 129	5	106, 797 273, 631	41 32	8	94,718 34,291	
Grand total	213	5	545,735	89	8	191,922	

Time in Operation, Work Done and Wages Paid in the Metallurgical Industry in Canada, 1921

Tant E 244

Montin		Copper Sine ee Smelters a Statistics	Silver-Cobalt-Nickel Smelters (Three Companies, Smelters and Refineries combined)				
	Total Man-days work done	Man-days Wages		Total Total Man-days Wages work done paid		Total Wages paid	
January. February March. April May June July August. September. October. November. December.	29, 295 17, 988 16, 988 17, 151 17, 450 17, 557 19, 174 12, 832 12, 147 11, 970	\$ 150, 158 131, 890 80, 773 76, 494 73, 708 76, 200 76, 881 83, 709 57, 328 51, 395 48, 525 46, 521	16,771 15,713 14,325 7,463 6,125 7,149 6,218 6,718 4,102 3,653 3,198 2,160	\$ 74,711 70,117 63,748 24,801 25,242 29,696 25,345 27,332 16,422 13,721 12,171 8,235	8,886 7,714 8,529 7,652 7,129 5,839 5,563 6,139 5,134 5,616 4,521 3,952	\$ 36,901 32,787 37,133 32,678 30,555 24,830 24,270 26,619 22,080 23,029 18,690 15,894	
Total	217,088	953,582	93,595	401, 541	76,724	325,466	

		Lead-Zinc Smelters and Refineries			
Month	Smelter S	Statistics	Refinery Statistics		
	Total Man-days work done	Total Wages paid	Total Man-days work done	Total Wages paid	
January February March April May June July August September October November	27,559 28,940	\$ 153, 638 148, 273 151, 014 149, 731 153, 463 151, 260 153, 866 152, 418 135, 739 120, 763 129, 112	4,960 4,312 4,526 4,650 4,960 4,950 5,084 5,394 4,740 4,681 4,380 4,929	\$ 22,209 19,141 20,680 20,615 22,380 22,293 22,891 24,416 21,287 19,854 19,270 21,088	
Total	29,984	133,310	57, 566	256, 124	

In Tables 245, 246, 247 and 248 following, are shown, the kind, quantity and value of the chemicals used, the fuel consumed, the power and machinery

employed, and the miscellaneous expenses.

In the first table, giving a total cost in chemicals amounting to \$254,627, the three groups compare closely, with the largest quantity used by the silver-cobalt smelters and refineries, namely, \$96,676; copper, lead and zinc used \$81,905 worth while the nickel-copper industry due to curtailed operations expended only \$76,046 on these commodities. The silver-cobalt smelting and refining showed the most extensive list of commodities used:

During 1921, the cost of fuel was greatest in the copper, lead and zinc group, although under more favourable conditions the nickel-copper group would show much larger fuel consumption. In a total of about four and one-half million dollars which was expended as fuel of all kinds, the copper, lead and zinc

spent \$2,009,371 while cost of fuel for the nickel-copper groups amounted to \$925,761. The silver-cobalt group showed a total cost of only \$162,382. The British Columbia smelters were entirely served by domestic fuel with the exception of gasoline of which they imported 1,475,729 gallons. The Ontario industries on the other hand, due to their location, were almost entirely dependent

on foreign fuels.

T. .... 040

In the table showing miscellaneous expenses the item "Cost of General Supplies" shows a rather large divergence between the nickel-copper group and the copper, lead and zinc group. This was possibly due to the reduced operations in the former group, its plants having been closed down entirely during a considerable portion of the year, and also to differences in the methods of book-keeping. The total cost of general supplies in the copper, lead and zinc group was more than five times that of the nickel-copper group, but under ordinary conditions this great difference should not occur.

Chemicals Used by Metallurgical Plants in Canada, 1921
TABLE 245

Commodity	Unit	Nickel-Copper Smelters and Refineries		Silver- Smelte Refii		Copper, Lead and Zinc Smelters and Refineries	
	Onit	Quantity used	Cost at plant	Quantity used	Cost at plant	Quantity used	Cost at plant
Aluminium dust	66		\$	12,161 255,215	\$ 6,739 8,438	120,353	\$ 35,853
Borax Limestone Caustic soda Hydrochloric acid	tons pounds	541		12,588 695 250,471 192	1,102 2,475 11,414 32	17,617 270 1,562	45,804 47 147
Lime. Liquid chlorine Nitre cake. Nitric acid	65 65	7,308,000	38,461 58	31,509 154,000 9,100	184 12,051 853	50	4
Potassium cyanide	46 46 46	326,000 774,005 1,576,000	4,385 19,661 3,942	19,325 1,336,683 793,260	5,730 16,258 21,910	252 25	32
Sodium chloride	66	1,936,000	7,787 426	17,731	907 8,583	15	16
Total			76,046		96,676		81,905

Fuels Used in Metallurgical Plants in Canada, 1921

	Unit of	Sme	Nickel-Copper Smelters and Refineries		Silver-Cobalt- Nickel Smelters and Refineries		Copper, Lead and Zinc Smelters and Refineries	
Kind Mea		Quantity	Cost Delivered	Quantity	Cost Delivered	Quantity	Cost Delivered	
Coal Anthracite	Short tons Bushels Short tons Imp., gal. Cords 1,000 cu. ft.	393 26, 619 41, 496 40, 534 24, 093 531, 853 654	13,201 625,798 5,753 44,466	5,594 12,445 7,603 142,666	345 96,389 17,863	793 94,563 188,394 1,813,760	264 1,228,109 43,233 228,672	
Total			925,761	. ,	162,382		2,009,37	

# Power and Machinery Employed in Metallurgical Industry in Canada, 1921

TABLE 247

	Nick	el-Copper		-Cobalt- ickel	Copper, Lead and Zine		
	No. of Units	Rated H.P.	No. of Units.	Rated H.P.	No. of Units	Rated H.P.	
Boilers:							
Fired by hand.	5	2,000	3	225	6	712	
Fired mechanically	13	5,875			7	3,878	
ingines:							
Steam	3	1,100			2	8.000	
Steam turbines	8	9,890					
Ayılraulic turbines or water wheels					9	8.400	
lectric motors:							
Alternating current	200	22,178	23	752	812	47 177	
Direct current	189	4.770			128	3.437	
ocomotives:	300	21110			200	0.101	
Steam	24						
Electric	23				4.4		
Compressed air							
ienerators or dynamos:							
Alternating current	4	KW 850			12	KW 9.180	
Direct current	11	KW 2,205	3 1	KW 70	40	KW 15, 459	
ir compressors	18	* 12,560	1	* 80	17	* 762	

<sup>\*</sup>Cu. ft. per min. free air.

# Miscellaneous Expenses Chargeable to Smelting and Refining Operations in Canada, 1921

TABLE 248

	Nickel- Copper Smelters and Refineries	Silver- Cobalt Smelters and Refineries	Copper, Lead and Zinc Smelters and Refineries	Total for Smelters and Refineries in Canada
Cost of purchased power. Cost of general supplies. Royalties.  Municipal. Taxes. Provincial Dominion. All other sundry expenses.	\$ 142,633 589,316 57,179 127,621 2,477 42,243 768,526	\$ 24,786 103,845 1,287 13,216	\$ 490,758 3,239,240 80,268 28,798 103,112 30,046 536,143	\$ 658, 177 3, 932, 401 138, 734 169, 635 105, 589 72, 289 1, 365, 021
Total	1,729,995	203,486	4,508,365	6, 441, 846

Materials Smelted and Products Made.—In Table 250, the average price for the year in a recognized market was used in computing the values except in the case of nickel-copper matte for which, as it was impossible to secure figures from the operators, a value of 10 cents per pound on the copper content and of 25 cents per pound on the nickel content was used.

The total quantities and values given will not agree with those shown in Part One as the mineral production of Canada, since a portion of the metal produced in the smelters was derived from foreign ores treated in Canada, and large amounts of gold and silver, recovered in mining and milling operations, did not pass through the plants described in this section.

It will be observed that the total value given in the table showing products made, is not the net value to the metallurgical companies and therefore cannot be used as a value to be included with the manufacturing industry of Canada. In order to secure such figures it would be necessary to deduct the costs of raw materials used, e.g., ore, concentrates and residues, or in other words the values accruing to the mining and milling industry of these raw materials treated during the period.

Ores, Concentrates, etc., Treated in Canadian Smelters, 1921

Group					
lickel-Copper—					
Ores treated	393,76				
Matte produced	19,49				
Matte exported for refining	10,46				
Matte treated in Canadian refineries	5,55				
ilter-Cobalt-Nickel—					
Ores treated	14				
Concentrates treated.	2.00				
Residues treated.	2,99				
opper, Lead and Zinc-					
Copper, ores and concentrates	1,016,30				
Todays and concentrates.	8,40				
Lead ores	48,01				
Lead concentrates					
Gold ores.	7,38				
Zinc residues	32,0				
Other ores	38				
Zinc concentrates	106, 23				

Products Made by the Metallurgical Industry in Canada, 1921

TABLE 250

Item	Unit	Quantity	Value
	70		\$
Vhite arsenic	Pounds	3,509,921	310,627
obalt	4	22,216	66,648
Cobalt oxide		216,875	464,112
fixed oxides		105,675	113,865
Sopper	. 66	36,051,554	4,506,444
Copper sulphate	. 66	548, 481	30, 166
fold	Fine ozs.	64,879	1,341,168
ridium		56	9,520
ead		62,333,281	3,579,177
Latte*-nickel-copper and silver-copper	Tons	14, 336	3,902,091
lickel		5, 458, 659	1,835,737
lickel castings		14.522	5,896
lickel oxide		7,879,055	1,595,508
Vickel sulphate		3, 139	38,415
alladium	24	269	20, 175
latinum		5,415,128	3, 392, 794
ilver	775 9	52,988,000	2, 466, 591
ine	11	294, 497	53,139
esiques		201, 701	00,100
Total			23,732,277

<sup>\*</sup>Exported, or not refined.

#### COST OF MATERIALS SMELTED

From the statements of mine operators showing net values received for all ores and concentrates, etc., shipped during the period, it was possible to make a fairly close estimate of the cost to the smelters. For ores, etc., treated by the silver-cobalt smelters an approximate average value per ton was easily found, and with the exception of the nickel-copper no difficulty for any ore was met with. As it was impossible to secure good figures for nickel-copper ore, a nominal value of \$6.00 per ton was used. Where residues passed through various plants from one process to another as at Trail. British Columbia, it was impossible to arrive at close figures, and as the total residues amounted to but a fraction of the commodities treated, they were left out of the compilation. Other residues have had values applied to them, based on their mineral content, where known, or from figures showing receipts from sales.

A tabulation showing approximately the total expenses incurred during 1921

may now be shown.

Summary of Expenditures in Metallurgical Works in Canada, 1921
Table 251

n n	cost of	ores,	etc.	treated	in	nicke.	cobal t coppe r, tead	r-sm	elters				2, 150, 000 2, 350, 000 3, 900, 000
Total salari Tost of che	ies and micals	wage	38								 		4,404,957 251,627
Cost of fuel discellance					0 0 0						 		3,097,514 6,441,846

## NON-METALLIC MINERAL INDUSTRIES

#### ASBESTOS

The banner year for the asbestos industry in Canada occurred in 1920, and was followed by a period of extreme depression in the market for this product in 1921. Although mining operations were curtailed only some 30

per cent, the demand for asbestos was very slight.

In the United States, conditions were similar; the production reported was only 50 per cent of the 1920 output. Contrary to the conditions prevailing in Canada and the United States, there was increased activity in the asbestos industry in Rhodesia and the Union of South Africa.

### Distribution of the Ownership of Asbestos Companies in Canada, Shipping in 1921

411	° 6.	w.	-	April 1	2	E	n
-1	А		Ŀ	Ŀ	6	IJ	4

	DISTI				
Security	Par value of se	Total			
	Canada	Great Britain	United States	Other Countries	
	8	\$	8	\$	\$
StocksBonds	19,074,969 650,000	1,467,300	7,886,780 40,500	82,500	28,511,549 690,500
Total	19,724,969	1,467,300	7,927,280	82,500	29,202,049

#### CAPITAL INVESTED

Under this heading the data tabulated deal only with asbestos companies reporting operations during the years under review. In 1920 the returns did not show the valuation of the lands.

Capital Employed in the Asbestos Industry in 1920 and 1921
TABLE 253

	1920	1921
Value of lands, buildings, plant machinery and tools	4,205,783	\$ 35,348,977 4,299,792 1,708,392
Total	21,839,090	41,357,161

<sup>\*</sup>Includes only value of buildings, plant machinery and tools.

The average number of days that each plant was in operation as computed from the reports by all producing firms in the asbestos industry in 1921 was; mine, 162 days; mill, 161 days. In the preceding year the average number of days operated by both mines and mills amounted to 173 days.

### Labour Statistics, Ashestos Industry in Canada, 1921

TABLE 254

	М	ine Statistic	Mill Statistics			
Month	Total Man-I		Total Wages	Total Man-Days	Total Wages	
	Surface	Under- ground	Paid	Work Done	Paid	
			\$		5	
January February March April May June July August September October	41,250 31,176 23,311 21,076 17,625 15,275	13,297 15,756 16,744 15,798 8,616 7,475 3,962 6,776 9,434 9,139	187, 377 214, 010 230, 270 203, 861 136, 243 109, 326 90, 201 98, 208 85, 389 79, 452	24,523 26,652 26,237 27,235 19,634 16,466 13,393 13,854 12,535 11,728	91, 391 107, 925 106, 881 106, 518 77, 267 58, 799 47, 145 51, 578 41, 493 38, 361	
NovemberDecember	15,645 14,376	8,782 8,326	84,005 80,392	12.280 11.327	36,504 36,810	
Total	276,730	124,105	1,598,734	215,864	800.672	
Average	235 days per year	246 days per year	\$3.99 per man per day	244 days per year	\$3.71 per man per day	

## Salaried Employees in the Asbestos Industry in Canada, 1920 and 1921 Table 255

	1920			1921			
	Number		Number		nber	_ Total	
	Male	Female	Total Salaries	Male	Female		
Superintendents and managers. Technical employees, engineers, etc	26 25 106	13	\$ 160,308 107,273 172,230	27 32 60	5	\$ 106,960 60,391 90,468	
Total	157	13	439,811	119	5	258,019	

## Salaried Employees, Mine and Mill, in the Asbestos Industry in Canada, 1921

TABLE 256

	On	Mine Pay	-Roll	On Mill-Pay-Roll		
	Number   Tota			Number		Total
	Male	Female	Salaries	Male	Female	Salaries
Superintendents and managers. Technical employees. Clerks, and stenographers.	16 20 39	4	\$ 71,180 36,888 61,555	11 12 21	1	\$ 35,780 23,503 29,113
Total	75	4	169,623	44	1	88,396

## Monthly Record of the Number of Wage-earners in the Asbestos Industry in Canada, 1920

TABLE 257

,482 August	3, 696 3, 600 3, 668 3, 746 3, 334 3, 478
3 3 3	3,464 July 3,482 August 3,592 September 3,695 October 3,692 November

The average monthly prices tabulated below have been computed from quotations given in the Engineering and Mining Journal-Press, during the year.

## Average Monthly Prices of Asbestos by Grades, 1921 (Short Tons)

Table 258

Month	Crude No. 1	Crude No. 2	Spinning Fibres	Magnesia and Compressed Sheet Fibres	Shingle Stock	Paper Stock	Cement Stock	Floats Stock
	\$	\$	\$	\$	\$	\$	8	\$
January	2,750	1,700	700	412	130	68	24	12
February	2,625	1,700	700	412	130	68	24	12
March	2,500	1,700	700	412	130	68	24	12
April	2,500	1,700	700	412	130	68	24	12
May	2,500	1,700	700	412	130	68	24	12
June	2,100	1,562	675	395	126	68	24	12
July	1,800	1,350	600	340	122	68	24	12
August	1.750	1,125	600	300	122	64	24	12
September	1,750	1,050	600	290	122	63	24	12
October	1,750	1,050	600	290	122	63	24	12
November	1,500	850	430	245	118	59	21	10
December	1,250	725	312	245	115	55	20	8.5
Average	2,065	1,351	610	347	125	65	24	11-55

### Fuel Used in the Asbestos Industry in Canada, 1920 and 1921

Kind	Quantity	Cost
		\$
Coal:         Bituminous         Short tons           Anthracite         "           Coke         "           Sasoline         Imp. gals.           Puel oil         "	27.610 1.347 7,269 1.878 2,140	212,066 14,784 90,590 765 428
Total		318,633
Total cost of fuel used in 1920.		395, 970

### Power Employed in the Asbestos Industry in Canada, 1920 and 1921 Table 260

	Numl	per of nits	Total I accordi Mfr's. H	ng to
	1920	1921	1920	1921
Boilers – Fired by hand Fired mechanically	43 6	38	4,145 475	3,030
Engines— Steam	17	9	4,010	2,810
Flectric Motors— Alternating current Direct current	294 48	327 41	20,714 5,453	22.065 4.520
Lecomotives— Steam. Electric.	15	30 12		
Cenerators or Dynamos— Alternating current Direct current	12	1 13		7(K.V.A.) 387(K.W.)
Air compressors	25	27		

### Miscellaneous Expenses in the Asbestos Industry in Canada, 1920 and 1921

	1920	1921
	8	8
ost of purchased power for mine and mill use	494,361 2,054,134 125,184	419,056 1,126,462 165,462
Faxes — Municipal	215,088	58,513 12,13 170,000
Federal	2,531,792	761,809
Total miscellaneous expenses.	5,420,559	2,713,44

## Summary of Financial Statistics relative to the Asbestos Industry in Canada, 1920 and 1921

Year	Salaries and wages	Miscellaneous expenses	Fuel	Total expenditures	Total value of production	
	\$	\$	\$	\$	\$	
1920	4,765,305 2,657,425	5,420,559 2,713,440	395,976 318,633		14,792,201 4,906,230	

An excerpt from the Engineering and Mining Journal-Press, April 22, 1922, is given below, showing the average tests on asbestos fibres for various purposes.

#### Asbestos Tests\*

Purpose	Thetford	Black Lake	East Broughton
Long spinning fibre. Medium spinning fibre. Magnesia pipe covering and compressed sheet Shingle stocks. Paper and millboard.	$ \begin{array}{c} 0-1\frac{1}{2}-9\frac{1}{3}-5 \\ 0-0-11-5 \\ 0-0-10-6 \end{array} $		1½-9-4½-1 0-8-6-2 0-5-8-3 0-1½-9½-5 0-0-11-5 0-0-10-6
Cement and roofing Sands, either of dark pulpy nature; short clean fibre or sandy. (For cement and flooring).	0-0-5-11 (a)	(a)	0-0-10-6 0-0-5-11 (a)

<sup>(</sup>a) No test.

In the Report from the Quebec Bureau of Mines, 1920, page 29, the following description is given of the

standard equipment used in testing asbestos:-

"The testing of asbestos, to check the grades and ascertain that their length of fibre corresponds to the specifications or requirements, is standardized. The test is conducted on a one pound sample of asbestos representing the average of a shipment. The testing apparatus consists of a nest of four rectangular trays, 24 inches long, 14 inches wide, and 5 inches deep, closely fitting on top of one another. The bottom of the upper tray, or No. 1, is a screen made of No. 12 S.W.G. wire, with openings \( \frac{1}{2} \) inch clear; the second tray is a 4 mesh screen or 4 openings to the lineal inch, No. 18 wire; the third tray is a ten mesh or ten openings to the lineal inch, No. 18 wire; the last or lowest tray has a solid bottom. The nest of four screens is made fast to a frame, to which an eccentric with a throw of \( \frac{3}{2} \) inch, gives a movement of 11 inch travel.

"The 16-ounce sample of asbestos to be tested representing the average of a shipment, is put on the upper tray which is covered. The machine is started at the rate of three hundred revolutions a minute of the shaft of the eccentric, and this is kept going for exactly two minutes. At the end of this time, the asbestos which remains in each tray is weighed accurately and recorded, and this gives the number of the grade of the asbestos. For instance, grade 2, 9, 4, 1 means that of the 16 ounce sample, 2 ounces remained on the ½ inch screen, 9 ounces on the ½ inch, 4 ounces on the ½ inch screen and one ounce went through the latter into the bottom tray. Under normal conditions, the greater the proportion remaining in the upper trays the higher the grade."

### Asbestos Companies Reporting Shipments during 1921

Name	Address	Name and Location of Mine
Asbestos Corporation of Canada, Ltd	260 St. James St., Montreal, Que	(King—Thetford Tp.  Beaver—Coleraine Tp.  British Canadian.  Fraser—Broughton Tp.  Gidle 1921)
Asbestos Mines, Ltd	282 St. Catherine St., Montreal Que	
Bell Asbestos Mines	Thetford Mines, Que	Bell—Thetford Tp.
Bennett-Martin Asbestos and Chrome Mines, Ltd	Thetford Mines, Que	Vimy Ridge—Ireland Tp. Thetford—Thetford Tp.
Black Lake Asbestos and Chrome Co., Ltd	282 St. Catherine St., Montreal Que. Coleraine, Que 450 St. James St., Montreal, Que 145 St. James St., Montreal, Que 145 St. James St., Montreal, Que Dominion Express Bldge., Montreal. Thetford Mines, Que	[Southwark—Coleraine Tp. Canada—Coleraine Tp. Jeffrey—Shipton Tp. Thetford—Thetford Tp. Federal—Thetford Tp.  Poulin—Broughton Tp. [Johnson's—Thetford Tp.] Jahnson's—Coleraine Tp.]
Maple Leaf Asbestos Corp., Ltd Pennington Asbestos Co Quebec Asbestos Corporation Windsor Asbestos Co., Ltd	Thetford Mines, Que	Maple Leaf—Coleraine Tp. Pennington—Thetford Tp. Quebec—Broughton Tp—Coleraine Tp.

#### COAL

Coal mining was carried on in Canada during 1921 in 396 mines which were operated by (1) 79 partnerships, (2) 102 individuals, (3) 168 joint stock companies. The incorporated companies operated 215 mines in all

The total capital invested in the industry at the close of the year was \$176,991,495 of which \$77,000,000 was invested in Nova Scotia, \$53,000,000 in the mines of Alberta, \$41,000,000 in British Columbia mines, \$3,000,000 in Saskatchewan and over \$1,000,000 in New Brunswick.

The coal mining industry in Canada gave employment during 1921 to more than 30,000 men and the wage bill for the year amounted to \$42,758,471. In addition to this \$3,717,238 was paid to salaried officials numbering 1,600 in all.

Complete detailed statistics relative to coal mining in Canada during the three years 1919-20-21 were published in a report recently issued by the Bureau entitled "Coal Statistics for Canada, 1919-20-21."

Properties.—No complete description of the coal mining properties is available from present records. For the year 1921 certain information was asked for in the annual reports made to the Bureau and summary tables have been prepared, which show the principal details of the information received. Table 263 entitled "Ownership, Area, etc., of Coal Mine Properties in Canada in 1921," shows for each province the area of lands held by coal mining interests together with the total length in feet of all underground workings. All the data given in Tables 263 and 264 were compiled from records received from mines operated during a part or the whole of the ealendar year 1921.

Ownership, Area, etc., of Coal Mine Properties in Canada, 1921
Table 263

		Nur		Total			
Provinces	Operat Joint comp	Stock		Operated by individual	Total No. of mines	Area of Mining properties	length of underground workings
	No. of	No. of				Acres	Feet
Nova Scotia (bituminous). New Brunswick (bitumin-	mines 53	Co's. 17		6	59	210,827	142,95
ous).	10	6	1	. 3	20	13,619	16,400
Saskatchewan (lignite)	5	5	6	38	49	9.493	45,88
Alberta, anthracite						8,000 89,804	11,50 204,57
" bituminous						96,561	612,63
Total, Alberta British Columbia (bitum-	134	129	72	55	261	194,365	828,70
inous)	12	10			12	284,578	399,38
Yukon (bituminous)	1	1	. , ,		1	552	
Total for Canada	215	168	79	102	396	713,434	1,433,33

#### Distribution of Ownership of Securities Issued by Joint Stock Companies Operating Coal Mines in Canada, 1921

TABLE 264

Place of Incorporation and		Held by 1	Residents of	Sept.	Total Par
Type of Security	Canada	Great Britain	United States	Other Countries	Value of Issued Securities
Nova Scotia—	\$	\$	8	8	8
Stocks	40,522,700		878,500		
BondsOther securities	738,000 4,067,440		235,282	1,603,500 172,070	
New Brunswick—	45,328,140	1,084,803	1,113,782	2,098,770	49,625,495
Stocks. Bonds. Other securities.	727, 450 80, 000		700,000		1,428,000 60,000
Total	787,450	550	700,000		1,488,000
StocksBonds. Other securities	2, 155, 741	170,459 612,840			2,326,200 612,840
Total	2,155,741	783,299		* * * * * * * * * * * * * * * * * * * *	2,939,040
Alberta—					
Stocks Bonds Other securities	27,521,854 2,236,230 98,040	1,684,927 1,373,649 556,460		5,377,755	40,699,712 3,854,846 654,500
Total	29,856,124	3,615,036	6,360,143	5,377,755	45,209,058
Stocks	5,198,082	5,230,989	14,268,283	55,820	24,753,174
BondsOther securities	3,348,393	8,006,141	2,970,500	124,293	14,449,327
Total	8,546,475	13, 237, 130	17,238,783	180, 113	39, 202, 501
Yukon—					
Stocks. Bonds. Other securities.	54,000	1,123	392, 256 75, 000		447,379 75,000
Total	54,000	1,123			522,379
Canada— Stocks	76, 179, 827	7,664,748	22,354,215	5,756,775	111,955,565
Bonds. Other securities.	6,382,623 4,165,480	9,992,630 1,064,563	3,290,467 235,282	1,727,793 172,070	21,393,513 5,637,395
Total	86,727,930	18,721,941	25,879,964	7,656,638	138,986,473

Financial Statistics.—To satisfy a demand for information regarding the capital employed in the coal mining industry and to permit of comparisons being made without similar statistics for the other basic industries, operators of producing mines were asked to itemize as for the year ending December, 1921, the amounts of capital employed in the operation of their coal mines. The data obtained were tabulated and are presented in Table 265, separation being made to show the amount of capital employed in the operation of the coal mines of the several producing provinces.

The data in Table 264 has reference to the ownership of the stock issued by joint stock companies operating coal mines in Canada during the past year. This table shows the several types of securities represented, together with the par value of the issued shares held by residents of Canada, Great Britain, United States and other countries, as indicating the place of residence of the investors. A second compilation has been made showing the total capital employed or invested in the coal mines in Canada.

One item of the financial statistics asked for in the 1921 survey was the general miscellaneous expenses incurred in operating the coal mines and the

data obtained have been collected in Table 269 which shows for each province the cost to the operating companies of several items such as purchased power, royalties, taxes, etc.

Total Capital Employed in the Coal Mines of Canada, as of December 15, 1921

TABLE 265

	Nova Scotia	New Brunsw'k.	Saskat- chewan	Alberta	British Columbia	Yukon	Canada
Value of lands, buildings,	\$	\$	\$	\$	\$	\$	8
Cost of all material on hand, supplies, finished		1,116,769	3, 167, 125	46,720,095	38, 138, 653	202,500	154,034,730
products, and ore on dump	6,775,185	39,971	28,479	1,524,904	859,327	1,690	9,229,562
able	5,610,482	208,056	181,008	5,402,497	2,325,160		13,727,203
Total Capital Employed	77,075,255	1,364,796	3,376,612	53,647,496	41,323,140	204, 196	176.991,495

Employees, Salaries and Wages.—Statistics of employment offer a valuable reflection of the progress made in any industry. In the past three years this subject has been given special attention, with the result that the data given in this report for 1921 are more illuminating than the limited figures available for previous years. The average number of employees working in the coal mines of the country had been ascertained for a number of years back, but it is only for 1921 that the work done in coal mines as measured in terms of man-days' work performed has been made available. In Table 266 the data given show the number of salaried employees on the colliery pay-rolls of each province for 1921. In addition to the number of employees in each class by provinces the salaries paid to the group have been shown.

The trend in employment throughout 1920 and 1921 may be observed by reference to Table 267 which shows for each coal producing province and for the Dominion the number of employees on the pay rolls for each month in the past two years. Further analysis embodying the data on days' work done, surface and underground, has been compiled in Table 268, which also shows the total wages paid by months. In future years these data showing the actual number of days' work performed by the colliery employees will prove most valuable for reference and comparison. Presently much of their value is lost owing to the fact that no comparable data exist for previous years. Nevertheless the information as given has a value which makes the table quite worth while. It is not without significance that the average number of days worked during the year by each colliery employee was 254 days for surface employees and 219 for those working underground and that the average for all should be 228 days for the year. The average wage received by each employee on the colliery pay-rolls was \$6.20 per day.

### Salaried Employees on Coal Mines Staffs for each Province and for Canada for Year 1921

TABLE 266

	_			Nov Scot			New Brun wick	S-		Sask			lbe	rta	Co	Briti dum Yul	bia		Tota for ana	
1	Salaried officers of the Cor-	No. Salary	90	126	28 , 080	40	7,	2 000	ş	11.	3 800	8	93	26 , 250	\$	65.	10 216	\$	303	69
2	General Superintendents and Managers	No. Salary	8	372	148 , 399	8	49,	17 055	8	44,	14 190	5	741	236 , 256	s	217	49,214	\$1,	424	464
3	Technical Experts, Account-	No. Salary	8	244	111 ,755	\$	11,	6 880	\$	12,	8 821	\$	363	152 , 656	\$	207	76 219	\$	840	353 , 331
4	Clerks, Stenographers and Salesmen	No. Salary	\$	354	260 , 245	89	10,	9 265	\$	31,	23 529	\$	387	228 , 342	\$	306	167 672	\$1	,090	687 , 053
5	Other salaried employees	No. Salary	8	37	30 , 585	. 85						8	21	23 ,809				\$	59	. 58 , 394
	Total	No. Salary																		

#### The above table includes:-

- (1) 47 female employees in item No. 4 and 8 female employees in item No. 5, making a total of 55 female employees in Nova Scotia.
- (2) 2 female employees in item No. 4, making a total of 2 female employees in New Brunswick.
- (3) 4 female employees in item No. 4 making a total of 4 female employees in Saskatchewan.
- (4) I female employee in item No. 1 and 41 female employees in item No. 4, making a total of 42 female employees in Alberta.
- (5) 1 female employee in item No. 1 and 28 female employees in item No. 4, making a total of 29 female employees in British Columbia.
- (6) 2 female employees in item No. 1 and 122 female employees in item No. 4, and 8 female employees in item No. 5, making a total of 132 female employees in the mines of Canada.

## Number of Employees engaged in Coal Mining in 1921 by months for each Province and for the Dominion.

TABLE 267

Months	Nova Scotia	New Brunswick	Saskatch- ewan	Alberta	British Columbia	Total for Canada
January	13,147	412	530	12,014	6,730	32,833
February	12,788	410	484	11,362	6,669	31,713
March	13,223		436	9, 251	6,488	29,754
April	12,000		392	8,384	6,517	27,647
May	11,850		368	7,069	6,426	26,122
June	12,391	411	343	7,711	6,413	27,269
July	12,743		309	8,639	6,612	28,773
August	12,654		305	9,907	6,701	30,058
September	12,928	473	357	10,473	6,861	31,092
October	12,891	487	481	11,402	7,030	32, 291
November	12,923		621	12,067	6,995	33, 179
December	11,968	539	590	11,945	6,894	31,936
Average	12,626	449	435	10,019	6,695	30,222

### Number of Employees, Work Done and Wages Paid by Months in the Coal Mines of Canada, 1921

TABLE 268

Month	Numb	er of Empl	oyees	Day	Total		
JAVIII II	Surface	Under- ground	Total	Surface	Under- ground	Total	Wages Paid
							\$
January	8,823	24,010	32,833	190,044	454,678	644,722	3,997,333
February	8,535	23, 178	31,713	169,604	395, 321	564, 925	3,468,00
March	8,156	21,598	29,754	165, 982	366,190	532, 172	3,328,35
April	7,459	20, 188	27,647	149,264	310,038	459,302	2,926,06
May	7,054	19,068	26, 122	146.825	333,652	480, 477	2,890,00
June	7,254	20,018	27, 272	154, 257	371,649	525, 906	3, 254, 23
July	7,554	21, 222	28,776	159,501	387,021	546,522	3,416,10
August	7.880	22, 181	30,061	180,983	463,415	644.398	4, 126, 49
September	8.041	23,051	31,092	170.878	428, 329	599, 207	3,777,48
October	8,193	24,098	32, 291	174, 295	443,624	617, 919	3,932,67
November	8,268	24.911	33, 179	185,503	479,386	664,889	3,994,97
December	8,026	23,910	31,936			618, 290	3,646,74
Total				2,026,499	4,872,230	6,898,729	42,758,47
A verage	7,937	22, 286	30, 223		219 days	228 days	\$6.20 per
	.,		50,	per year	per year	per year	day

## Miscellaneous Coal Mine Operating Expenses, by Provinces, 1921 $_{\rm TABLE~269}$

Province	Cost of purchased power	Cost of all materials and		Taxes	s Paid		All other	Total miscel-
	for mine use	supplies used in or about the colliery			Provincial	Federal	sundry expenses	expenses
Nova Scotia New Brunswick Saskatchewan Alberta British Columbia Yukon	24,143 1,684 73,335	53,976 3,131,099 2,729,506	18,796 10,847 473,399	3,576 7,555 100,571	3,323 389 166,652	5,400 2,903 149,802 61,488	32,826 1,743,569 453,305	110,180
Total for Canada	1,856,466	8,993,794	1,290,730	304,490	290,208	255, 192	5,230,683	18,221,563

Power Employed in Coal Mines of Canada by Provinces for 1921
TABLE 270

	Nov	a Scotia		New Inswick	Sasks	tchewan	Al	berta		itish umbia		tal for
SIETILE	No. of units	Total H.P. rated	No. of units	Total H.P. rated	No. of units	Total H.P. rated	No. of units	Total H.P. rated	No. of units	Total H.P. rated	No. of units	Total H.P. rated
Boilers— Fired by hand Fired mechanically	184 37	24,521 14,316	19	657			193 22	23,523 4,810	79	11,169 1,200		0-1-00
Stationary Engines (including engines used for hoisting, pumping, etc.)— Steam. Steam turbines. Gns. Oil.	294 12	28,750		558	·····i	780 15	6	28,019 2,952 333 1,940		14,850	670 18 31 20	31,702 348
Hydraulic Turbines or Water Wheels									2	12,000	2	12,000
Electric Motors— Alternating Direct current	242	18,172 115	7	185	21	299	265 99	9,901 2,415	86 29	2,476 762		30,734 3,591
Locomotives— Steam Electric Compressed air	11 4	50	1		1 2	60	15 14 42	360 2,096	9 16		37 36 42	920 2,096
Generators or Dynamos— Alternating current Direct current	19	27,020 165	1	240	7	940	39 34	8,125 30,574	14 13	9,355 818	73 61	44,740 32,497
Table Fil		Capac- ity cu. ft. per min. free air		Capacity cu. ft per min. free air		Capac- ity cu. ft. per min. free air		Capacity cu. ft. per min. free air		Capacity cu. ft. per min. free air		Capac- ity cu. ft. per min. free air
Air Compressors	39	981,600			1	450	55	107,028	20	33,624	115	1,122,702
Other Equipment: Steam shovels	4 1 23 1						6 4 27 2		41	,	5 91	
Steam Compressed air Electric Internal combustion							7 155 30 1					

#### FELDSPAR

Although feldspar occurs in many deposits throughout Canada, operations in this industry in 1921 were confined principally to the provinces of Ontario and Quebec. Over 90 per cent of the Canadian output was shipped to United States grinding plants in the form of crude spar for use in the ceramic industry. It is essential, therefore, that the deposits operated should have good transportation facilities in addition to being conveniently located to the United States markets.

The feldspar grinding plant at Ashbridges Bay, Toronto, Ontario, was active throughout the year. The Frontenac Floor and Wall Tile Company, Limited, of Kingston, Ontario, creeted a plant in 1921 with a capacity of 1,500 tons per year for the purpose of grinding Canadian spar for domestic consumption.

Twenty-two firms reported shipments from Ontario and Quebec quarries in 1921. Of these, perhaps the most outstanding one was the "Derry Mine" near Buckingham, Quebec. This deposit was located in the preceding year and is now considered the most important body of feldspar in Canada.

Complete statistics (covering capital employed, salaries and wages, power equipment and fuel used in this industry) are shown in the following tables.

### Capital Employed in the Feldspar Industry in Canada, 1921

TABLE 271

	Value
Lands, buildings, plant machinery and tools.  Cost of all materials on hand, supplies, finished products and ore on dump.  Cash, trading and operating accounts and bills receivable.	\$ 427,310 45,214 12,109
Total capital employed	484,633

### Salaried Employees in the Feldspar Industry in Canada, 1920 and 1921

TABLE 272

	Number							
Year	Male	Female	Total	Salaries				
		34		8				
1930	13 L1	3 1	16 12	15,778 18,223				

Wage-earners in this industry were paid a total of \$128,553 during the year, divided as follows: Quebec employees received \$33,084, and those in Ontario, \$95,469. The total number of days the Ontario quarries were operated amounted to 1,522; while the deposits in Quebec were active for a total of 601 days. The days' work done in the former province amounted to 25,150 and in the latter to 10.884.

## Time in Operation, Man-days' Work Done and Total Wages Paid in the Feldspar Industry in Canada in 1921, by Months

TABLE 273

Month	Average	Total	Total
	number	Man-Days'	Wages
	of employees	Work Done	Paid
			5
January February March April May June July August September October	198 187 140 118 105 99 92 85 120 116 166 145	4,717 4,189 3,053 2,722 2,488 2,266 2,090 1,973 2,903 2,883 3,208 3,542	18, 07: 15, 60: 11, 36: 10, 01: 9, 31: 8, 65: 7, 62: 7, 09: 9, 74: 9, 61: 10, 73:
Peasinbar		36,034	128, 55
Total		275 days	\$3.57 per mar
Average.		per man	per day

### Fuel Used in the Feldspar Industry in Canada, 1921

TABLE 274

Kind	Quantity	Cost Delivered
Bituminous Coal Short tons Gasoline Imp. gals. Wood Cords	165 30 631	\$ 1,719 11 2,507
Total	, , , , , , , , , , , ,	4,237

\$6,306

### Power Employed in the Feldspar Industry in Canada, 1920 and 1921 TABLE 275

Total cost of fuel consumed in 1920.....

	No. of	Units	Total rated H.P.		
Description •	1920	1921	1920	1921	
Boilers—Fired by hand	11	12	320	336	
Stationary engines— Steam Gas	7 1	12 1	138	212	
Air compressors	1	3		Capacity 105 cu. ft.	
Other equipment— Power shovels—steam Derricks—steam	*	8 9			

<sup>\*</sup>Data not available.

#### Miscellaneous Expenses in the Feldspar Industry in Canada, 1920 and 1921

**TABLE 276** 

	1920	1921
or matther to a William I mounted needs with materia	\$	\$
Cost of all materials and supplies used Taxes— Municipal Provincial Provincial Royalties paid All other sundry expenses.	24,246 50 1,236 27,004	39,364 { 13 114 5,722 10,415
Total miscellaneous expenses	52,536	55,628

### Summary Statistics relating to the Feldspar Industry in Canada, 1917-1921 Table 277

Year	Number of operating mines	Average number of employees	Total salaries and wages paid	Total value of production
			\$	8
1917 1918 1919 1920 1921	8 12 12 12 20 •19	101 143 98 277 236	55,742 108,592 46,870 152,379 146,776	89.826 112,728 86,231 280,895 230,754

<sup>\*23</sup> mines reporting shipments.

List of Firms Reporting Shipments in the Feldspar Industry in Canada, 1921

Name	Address	Location
Nova Scotia— Norman MacMillan (owner)	Lower Stewiacke, Colchester Co., N.S.	Near Beach Hill Settlement Halifax Co., N.S.
Quebic— Buckingham Feldspar Company W. G. Masson. O'Brien and Fowler Bush Winning	Buckingham, Quebec. 72 Sparks St., Ottawa, Ont. Bank of Nova Scotia Bldg., Ottawa, Ont. N. D. de Salette, Quebec	Aylwin Tp. • Derry Tp.
Ltd. Eureka Flint and Spar Co., Ltd Federal Feldspar, Limited	e/o H. Fisher, Ottawa, Ont	Portland Tp. Bedford Tp. Bedford Tp. and Portland
Gardner Feldspar Company Industrial Minerals Corporation of Canada, Ltd.	60 Front St. East, Toronto, Ont Hartington, Ont 805 Bank of Hamilton Bldg., Toronto, Ont. Humber Bldg., Highland Park, Detroit, Mich, U.S.A.	Loughboro Tp.
North American Feldspar Ltd	Perth, Ont	Glamorgan Tp.
Orser and Wilson Provincial Feldspar Co Rock Products Company	563 William St., Buffalo, N.Y., U.S.A. Perth, Ont. 33 Richmond St. W., Toronto, Ont. Nicholas Bldg., Toledo, Ohio, U.S.A. c/o Cunningham & Smith, Kingston,	Loughboro Tp. Sherbrooke South, Tp. Bathurst Tp.
Verona Mining Company	Ont. 404 Harrison Bldg., Philadelphia, Pa.	Monteagle Tp.
	33 Richmond St. W., Taronto, Ont Kingston, Ont	

#### **GYPSUM**

The principal gypsum deposits operated in Canada during 1921, were located in the following centres, Hants and Victoria counties, Nova Scotia; Albert county, New Brunswick; Haldimand county, Ontario; Gypsumville, Manitoba; and in the Lillooet District, British Columbia.

Of the eight firms producing gypsum in the Maritime Provinces, six were controlled by American capital. The output of these six mines was exported in the raw form to the United States, where it was treated in the manufacturing plants owned by the same interests. The remaining two firms mined and calcined their own output, principally for consumption in Canada.

In Ontario and Manitoba, the raw gypsum was used mainly in the manufacture of cement, wall plaster, wall board, fireproof tile and blocks, and plaster of paris. The British Columbia deposit was operated rather as an experiment and the resultant product was sold to the farmers for use on the land.

Operations in this industry were conducted by eleven operators, ten of which were incorporated companies, and one an individual producer in the province of British Columbia.

53150-13

The latest United States tariff regulations, effective on September 22nd, 1922, provide a duty of \$1.40 per ton on all imported plaster rock or gypsum, ground or calcined.

### Number and Distribution of Ownership of Operating Companies in the Gypsum Industry in Canada, 1921

TABLE 278

	N h		Distri	bution of O	wnership		
Province	Number of Compan- ies	Par Valu	e of Secur and held by	rities issued y residents	d by Inco of the Cou	rporated C ntries indic	ompanies ated
	Operating	Security	Canada	Great Britain	United States	Other Countries	Total
		10. 3	\$	- \$	\$	\$ 00.000	\$
Nova Scotia	. 6	Stocks Stocks	8,400		100,000	68.350	939,500 150,000 399,000
New Brunswick		Bonds Stocks Bonds			295,700		619,300
Manitoba		Stocks Bonds					
British Columbia	. 1						
Total	. 11	(Stocks Bonds		400	1,384,500 100,000	68,350	2,832,800 150,000

## Capital Invested in the Gypsum Industry in Canada in 1921, by Provinces TABLE 279

	Nova Scotia	New Brunswick	Ontario, Manitoba and British Columbia	Total for Canada
	\$	\$	\$	8
Lands, buildings, plant machinery and tools	879,960	439,099	1,426,328	2,745,387
Cost of all materials on hand, supplies, finished products and ore on dump	118, 214	113,372	182,999	414,585
Cash, trading and operating accounts and bills receivable	410,250	86,550	193,004	689,804
*Total investment	1,408,424	639,021	1,802,331	3,849,776

## Salaried Employees in the Gypsum Industry in Canada, 1921 TABLE 280

	On Mine Pay-roll			On Mill Pay-roll			
	Number of Employees		yees Total Employees				
	Male	Female	Salaries	Male	Female	Salaries	
	111		\$			\$	
Superintendents, managers, etc	10	1	22,736	10		31,898	
chemists, draughtsmen, etc		2	6,545 6,335	1 1	2	2,100 3,300	
Total	19	3	35,616	=12	2	37,298	

## Number of Employees, Work done and Wages paid by Months in the Gypsum Industry in Canada, 1921

T.				

		Mine St	atistics			Mil	Statistics		Total
Month	Average N Empl	lumber of oyees	Days Wo	rk Done	Wages Paid	Average Number of	Days Work	Wages	Wages Paid (Mine and
MODELI	Surface	Under- ground	Surface	Under - ground		Em- ployees	Done	Paid	Mill)
January February March April May June July August September October November December Total Average	425 347 364 334 407 448 442 484 539 541 494 423	56 78 79 106 97 91 72 76 75 94 65 48	7,350 6,498 6,149 5,344 7,061 8,379 8,743 9,608 10,709 8,899 7,320 96,896 222 days per year	1.318 1.778 2.059 2.179 1.763 1.614 1.266 6.1333 1.512 1.545 1.506 806	\$ 31,462 33,068 28,704 26,167 35,154 35,806 20,963 34,336 38,928 42,228 27,440 402,890 \$3-49 perday	232 219 271 303 305 268 265 270 264 239 164	5,018 5,153 5,426 6,307 7,018 7,038 6,430 6,611 6,514 6,322 5,714 3,806 71,357 284 daya per year	22,066 23,454 27,734 29,465 29,218 26,279 27,400 26,489 26,442 23,590 15,298	65,024 56,242 61,745 65,417 66,076 65,818 42,738

## Average Number of Employees in the Gypsum Industry in Canada in 1921, by Provinces

TABLE 282

Months	Nova	Scotia	New Br	runswick	Onte	ario	Manitoba	
Months	Mine	Mill	Mine	Mill	Mine	Mill	Mine	Mill
January	315	15	96	90	46	22	24	8
February	231	14	105	73	67	45	22	10
March	283	14	61	41	69	46	30	11
April	282	15	65	61	80	43	13	15
May	305	39	93	89	85	44	21	13
June	326	41	93	94	85	43	33	12
July	352	43	75	83	60	42	27	10
August	395	41	85	78	64	38	16	10
eptember	432	43	100	71	85	49	17	10
October	436	46	93	73	84	47	22	{
November	403	29	83	67	56	44	17	5
December	339	27	86	38	37	41	9	
Average	342	31	86	71	67	42	21	10

### Fuel Consumed in the Gypsum Industry in Canada, 1921

PRA			MAR
- 10	ATOR	100	283
.24	1201	4.50	arcsu

Kind	Unit of Measure	Quantity	Cost delivered
Bituminous coal Coke. Gasoline Wood Gas, natural.	Short tons Imp. gals. Cords M cu. ft.	11,263 360 1,122 105 8,662	\$ 105,860 5,894 549 717 3,534
Total			116,554

### Power Employed in the Gypsum Industry in Canada, 1921

	284

Description	Number of units	Total rated H.P.
Boilers—Fired by hand	17	1,225
Stationary Engines— Steam Gas	7 8	1,245 76
Locomotives—Steam	2	1
Electric Motors— Alternating current. Direct current.	54 16	3,918 196
Generators and Dynamos— Alternating current. Direct current.	1 2	Capacity 5 K.V.A. 90 K.W.
Air Compressors	6	Capacity cu. ft. per min. free air 181 cu. ft.
Other Equipment— Power shovels—Steam Power Drills— Steam Compressed air. Electric.	4 11 1 5	

# Miscellaneous Expenses in the Gypsum Industry in Canada, 1921 Table 285

	\$
Cost of purchased power	23,876 428,905 495
Taxes— Municipal. Federal. All other sundry expenses.	20,941 3,125 88,497
Total miscellaneous expenses	565,839

# Summary Statistics relating to the Gypsum Industry in Canada, 1917-1921 TABLE 286

Year	Number of operating mines	Average number of employees	Total salaries and wages paid	Total value of production
			8	\$
1917. 1918. 1919. 1920. 1921.	12 8 13 11	774 435 725 1,016 766	445,128 275,312 380,105 955,602 774,551	881,984 823,006 1,215,287 1,893,991 1,785,538

### List of Producing Companies in the Gypsum Industry in Canada, 1921

Name	Addres8	Location		
Nova Scotia— Wentworth Gypsum Co., Ltd Newark Plaster Company. Lona Gypsum Co., Ltd Windsor Gypsum Co. Windsor Plaster Co., Ltd. Rock Plaster Corporation. New Brunsteick— Albert Manufacturing Company. Hillsborough Plaster, Quarrying and Mfg. Co. Ontario— The Ontario Gypsum Co., Ltd British Columbia— L. Burley (now Soda Mining and Products Co., Ltd.).	Windsor, N.S. Newark, New Jersey Lona, C.B., N.S. Newburgh, N.Y. Windsor, N.S. 40 Rector St., New York, N.Y. Hillsborough, N.B. Hillsborough, N.B. Paris, Ont.	Hillsborough, Albert county, Edgetts Landing, Albert county Caledonia, Seneca tp. Lythmore, Oneida tp.		

#### MICA

The important deposits of mica in Canada are located in the counties of Ottawa and Labelle, in Quebee, and Lanark, Leeds and Frontenae, in Ontario. The product of these mines is, in the main part, shipped first to mica trimming shops, conveniently located, where it is either rough cobbed or split, and trimmed for market and thence exported to United States or Great Britain. During 1921, the mica exported to United States represented 98 per cent of the Canadian production, while the remainder was shipped to Great Britain and other countries.

The principal causes for the falling off in demand for mica may be traced to the decline in the market for automobiles and electrical supplies. This became apparent during the closing months of 1920, when there was a general slackening in the demand for all industrial commodities. While the automobile industry was flourishing, the sale of mica for use in spark plugs, generators, condensers and starters was very brisk.

Twenty operators reported sales of mica during 1921; of this number, fourteen were in Quebec, and six in Ontario. Individual owners predominated, there being only three incorporated companies active in this industry.

Statistics relating to the extensive mica trimming shops in Ontario and Quebec have not been included in this report, but will be treated under a separate heading and made available for distribution in bulletin form.

Capital Invested in the Mica Mining Industry in Canada in 1921, by Provinces

Table 287

	Quebec	Ontario	Total for Canada	
	8	\$	8	
Lands, buildings, plant machinery and tools	137,080	86,073	223, 153	
on dump	21,654 23,933	294,644 12,853	316,298 36,786	
Total investment	182,667	393,570	576.237	

Salaried Employees.—Four salaried employees were engaged in the operating of mica mines in Quebec and one in Ontario. Salaries paid amounted to \$7,738.

#### Average Number of Employees, Work done, and Wages paid in the Mica Industry in Canada in 1921, by Provinces

TABLE 288

- 1,40,64		Quebec			Ontario			Total	
Month	Average Number of Wage- Earners	Days Work Done	Total Wages Paid	Average Number of Wage- Earners	Days Work Done	Total Wages Paid	Average Number of Wage- Earners	Days Work Done	Total Wages Paid
January	29 26 32	2,310 2,316 2,467 2,286 2,496 2,127 2,067 1,014 819 734 619 771 20,026 282 days per man per year	\$ 4,835 4,771 4,917 4,900 5,364 4,800 4,128 2,680 2,024 1,712 1,450 1,565 \$2,11 per day	25 30 29 33 31 32 32 26 24 23 16	776 536 702 605 730 650 684 736 572 497 528 336 7,352 263 days per man per year	2,162 2,512 1,790 1,381 1,597	130 133 128 135 124 119 75 60 53 49 48	3,086 2,852 3,169 2,891 3,226 2,777 2,751 1,750 1,391 1,231 1,147 1,107 27,278 277 days per man per year	7,245 6,885 7,618 6,850 6,290 5,192 3,814 3,093 3,047 2,650

Fuel Used.—The consumption of fuel in the industry was very small amounting in value to \$750 for Quebec and \$3,604 for Ontario, a total of \$4,354 in all.

### Power Employed in the Mica Industry in Canada during 1921, by Provinces

		Quebec		Ontario	Total		
Description	No. of Units	Total H.P. according to Manufacturer's Rating	No. of Units	Total H.P. according to Manufacturer's Rating	No. of Units	Total H.P. according to Manufacturer's Rating	
Boilers—							
Fired by hand	2	55	4	240	6	295	
Stationary engines— Gas	1	20			1	20	
Hydraulic turbines or water wheels	1	125			1	125	
Electric motors— Alternating current	5	110			5	110	
Generators and dynamos— Alternating current	1	Total capacity 115 K.V.A.			1	Total capacity 115 K.V.A.	
	0	Capacity cu. ft. per min. free air 861	2	Capacity cu. ft. per min. free air	4	Capacity cu. ft. per min. free air 2.269	
Air compressors	2	001		1,408	- 1	4,209	
Power drills, compressed air Hoists, steam	2	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	4		4 3		

### Miscellaneous Expenses Incurred in the Mica Industry in Canada during 1921, by Provinces

TABLE 290

ptionseason	Quebec	Ontario	Total
Cost of purchased power. Cost of all materials and supplies used. Royalties paid. Municipal. Taxes Provincial. Federal. All other sundry expenses.	\$ 50 6,041 85 636 105 3,338 2,101	\$ 2,083 60 596 4,648	\$ 50 8,124 85 696 701 3,338 6,749
Total miscellaneous expenses	12,356	7,387	19,743

### Summary Statistics relating to the Mica Industry in Canada, 1917-1921 Table 291

Year	Number	Average	Salaries	Total
	of	number of	and wages	value of
	operators	employees	paid	production
1917. 1918. 1919. 1920.	28 16 21 20 20	283 165 147 186 104	\$ 119,440 84,521 109,411 145,247 74,432	\$ 358,851 271,550 273,788 376,022 70,063

#### List of Operators Reporting Shipments of Mica during 1921

Name	Address	Location (Township)		
Puebec—				
Ahearn, W. A	538 McLaren St. Ottawa	Hull		
Blackburn Bros				
The Capital Mica Co., Ltd				
Hamilton Syndicate				
The La Fortune Mining Co				
Flynn, H. T.				
Gauthier and Gibault	Prokingham Ous	Dominad		
Gowan, Wm	Holland Mills	Dowtland West		
Laurin, Philip.				
The Laurentide Mica Co., Ltd				
Nault, Adolphe	Delin O	Nameron		
Wallingford Bros., Ltd	rerkins, Que	North Templeton		
Winning, Bush				
Keene Mica Products Co., Ltd	Keene, New Hampshire, U.S.A.	Villeneuve		
ntario-	a see William Cold William			
Elliott, Wm. M	3433 Walnut St., Chicago, Ill	Butt		
Kent Bros. and Estate J. M. Stoness.				
Kingston and Perth Mining Co				
The Loughborough Mining Co., Ltd.	Sydenham, Ont	Loughborough		
McLaren, W. L	Nevis Cottage, Perth, Ont	North Burgess		
Tory Hill Marble and Mica Co., Ltd.	Tory Hill, Ont	Glamorgan		

#### NATURAL GAS

No records are available prior to 1892, as to the production of natural gas in Canada. An estimate of the value of gas produced during that year was placed at \$150,000.

The extensive developments of the oilfields in Ontario made available for consumption large quantities of natural gas. From 1892 to 1902 inclusive, Ontario was the only contributor of this commodity. In 1903, the first produc-

tion from other provinces was recorded. The value of natural gas produced during 1903 was approximately \$202,000 and from that year there was an increase in production until in 1917, the grand total value was \$5,045,298. In the following years a considerable decrease in valuation was recorded.

A summary of the natural gas industry in Ontario during 1921 is provided in the following excerpt from the report issued by Col. R. B. Harkness, Com-

missioner of Gas for Ontario:-

"This decrease is due to three causes, viz., (a) Natural decline of the gas fields, (b) A general raise in the rates charged for gas, (c) Drastic regulations that restrict the sale of gas to domestic use only, with a very limited quantity for manufacturing purposes. Although this winter (1921-22) has been, if anything, slightly colder in the gas fields than last winter, a better distribution has been maintained and no complaints have been received of poor service (low pressure) where fault could be found with the operating companies. Field conditions are being improved but in many cases the improvement has come too late. As a result, the Eastern Gas Field (Haldimand and Welland) is very near the end of its long life. Scores of wells must be plugged next year. In Western Field (Kent County) conditions are much better. Here operations have been conducted by large companies with engineers of wide experience in charge. No new gas fields have been discovered, although five "wildcat" wells were drilled during the year, a considerable decrease in valuation was recorded."

Alberta.—The producing fields in this province during 1921 were, the Medicine Hat; Bow Island (about 40 miles west of Medicine Hat); and the Turner Valley gas field (35 miles southeast of Calgary). The total number of wells reported as producing during the year was 64, a similar number as was reported active in 1920. In addition to the fields mentioned previously, wells have also been bored successfully in the Viking gas field situated approximately 80 miles southeast of Edmonton.

New Brunswick.—The producing wells in the province of New Brunswick are confined to the Stony Creek field in Alberta County, about eight miles south of Moncton. The natural gas produced is used largely for power, domestic heating and lighting purposes in Moncton. On December 31, 1921, there were twenty productive wells, one well having been exhausted during the year.

Character and Distribution of Ownership of Producing Companies in the Natural Gas Industry in Canada during 1921, by Provinces

	New Brunswick	Ontario	Manitoba	Alberta	Total for Canada
Number of operators. Character of ownership— Individual. Incorporated companies.		87 56 31	1	15 15	104 57 47
Distribution of ownership showing the par value of stocks and bonds issued by incorporated companies and held by residents of the countries indicated— Canada— Stocks. Bonds. Other securities. Great Britain—Stocks. United States— Stocks. Other securities.		130,599		5,646,900 168,300 54,624 2,573,400 114,700 9,145	13,014,346 168,300 54,624 2,703,996 6,816,678 9,145
Other countries—Stocks		4,000			\$22,771.09

## Capital Employed in the Natural Gas Industry in Canada, 1921, by Provinces

TABLE 293

Name of the last o	New Brunswick*	Ontario	Alberta	Total
Lands, buildings, plant machinery and tools			\$ 12,030.245 392,916	\$ 25,826,241 593,990
able		3,331,687	407,187	3,738,874
Total investment	209,373	17,328,757	12,830,348	30,368,478

<sup>\*</sup>Only one company operating,

### Salaried Employees in the Natural Gas Industry in Canada, 1921 Table 294

	No. of E	mployees	Total
	Male	Female	Salaries
Superintendents, managers, etc	43		\$ 92.374.
men, etc. Clerks, stenographers, etc.	6 41	35	10,425 75,100
Total	90	35	177,899

### Average Number of Wage-earners and Wages Paid in the Natural Gas Industry in Canada, 1921

TABLE 295

Month	Average number of wage- earners	Total wages paid
		5
January	602	48,406
February	610	47,542
March	614	50,462
April	684	53,513
May	696	57,142
June	737	59,782
July	738	60,539
August	722	60,399
September	729	59,260
October	792	63,797
November	884	70,513
December	925	73,653
Total	760°	705,008

<sup>\*</sup>Average.

### Power Employed in the Natural Gas Industry in Canada, 1921

Oescription		Total Rated H.P.
Beiters— Fired by hand Fired mechanically	9 5	295 210
Stationary engines— Steam Gas. Oil	16 116 2	425 2,530 10
Hiter in motors— Alternating current. Distact current.	8	97 2 Total
Gracutors or Dynamos— Alternative current	ე	capacity K.V.A.

### Miscellaneous Expenses in the Natural Gas Industry in Canada, 1921

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	\$
ost of purchased power	10
ost of all materials and supplies used.	113.44
Royalties paid.	39,033
(Municipal	64,41
axes Provincial	54,48
[Federal	122,94
All other sundry expenses.	1,010,88
Total miscellaneous expenses	1,405,22

### Gas Wells in Canada during 1920 and 1921

	New Bruns- wick	Quebec	Ontario	Manitoba	Alberta	Total
Productive wells at beginning of year						
1920	23	*6	1,872	1	67	1,969
1921	21	*6	1,862	1	61	1,954
Number of productive wells drilled . 1920			93			9:
1921			105		3	109
Number of dry wells drilled 1920			24 21		2	20
Number of wells abandoned1920	2		117		3	129
1921	1		112		0	11:
roductive wells at end of year 1920	21	*6	1.862	1	64	1.95
1921	20	*6	1.930	î	64	2.021

Edle.

### Natural Gas Wells in Ontario in 1921, by Townships

Table 299

Township	No. of producing wells in operation Dec. 31, 1921	No. of wells abandoned this year	No. of dry wells drilled this year	No. of producing wells drilled this year
Amabel	2			
AldboroBarton	2			
Bayham	56	1		1
Bertie	97	6		8
Beverly			1	
Binbrook	71	2	3	6
Caistor	50 158	13		
Canboro	44	0	3	4
Cayuga, North	62	1	9	
Charlotteville	14	î		
Crowland	50			3
Dawn	1			1
Dover, West	8 20	1	2	
Dunn	6	1		1
Enniskillen Euphemia	6			
Flanboro, W.			1	
Gainsboro	2	1		
Glanford	28	3	1	1
Gosfield	1			1
Houghton	2	3		
Humberstone	118	5		
Mersea	4			1
Middleton	17			2
Missouri, West	3			
Malahide	91	2	2	7
MoultonOneida	23			9
Onondaga,	53	4		
Rainham	122	9		
Raleigh	24	3		1
Romney	95	2		
Sarnia	25			
Senera	161	1	3	28
Sherbrooke	147	13		12
Tilbury, East	55	1	1	12
Walpole	157	16	2	4
Walsingham, North.	6	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		2
Walsingham, South	15			1
Windham	5			
Willoughby	51	4	1	
Woodhouse	63	4		3
FF-4-1	1 020	110	21	105
Total	1,930	112	21	100

## Summary Statistics relating to the Natural Gas Industry in Canada, 1917-1921

Table 300

Year	Number of operators	Average number of employees	Salaries and wages paid	Total value of production
1917	105 101 99 104 103	597 711 681 616 885	\$ 520,290 641,542 631,567 643,320 882,907	\$ 5,045,298 4,350,940 4,176,037 4,232,642 4,594,164

#### PETROLEUM

The production of petroleum in Canada dates back to 1857, when a shallow well was dug near Enniskillen (now known as Oil Springs), in the province of Ontario.

Early in January, 1862, a pioneer oil prospector brought in the first flowing well at Oil Springs, Ontario, and before the fall of the same year there were approximately 35 producing wells in operation. According to information available some of these wells produced from 3,000 to 6,000 barrels per day.

In 1865, Petrolia came into existence as a large producer and since that date has maintained its position among the leading oil fields in Canada. Prior

to this discovery, oil deposits were located in Kent county, at Bothwell.

Although it will be seen by the foregoing that Petrolia, Oil Springs and Bothwell are by far the oldest producing fields in Canada, a survey of the 1921 production figures will show that these three fields continue to rank as the

premier producers in this country.

The first attempt to develop the oil deposits in Westmoreland County in New Brunswick, was made in 1859. The four wells drilled then were not successful as fresh water seeped in, ruining them. No further drilling was attempted until 1879, when two more wells were sunk, one at St. Joseph and the other at Dover. From 1900 to 1906 some seventy-two wells were drilled. The distribution of this number was as follows: 67 in Westmoreland county, 4 in Albert county and one in Kent county. This marked the opening up of the present Stony Creek oil and gas field.

In May, 1914, considerable interest was taken in the Turner Valley oil field in Alberta. The centre of this field is about 25 miles south of Calgary. Since 1914 operations have been carried on in this district by some five companies.

The new oil fields in the Mackenzie district of the North-West Territories have been the scene of considerable activity during the past several years. The Imperial Oil Company commenced drilling operations in this district, about 40 miles below Fort Norman, early in 1920.

Tables 301 to 306 inclusive do not contain any data regarding New Brunswick wells as these have been included under "Natural Gas."

#### Character and Distribution of Ownership of Producing Companies in the Petroleum Industry in Canada during 1921, by Provinces Table 301

	Ontario	Alberta	Total for Canada
Number of operators	115	5	120
Character of ownership— Individual. Incorporated companies.	102 13	5	102 18
Distribution of ownership showing the par value of stocks issued by incorporated companies and held by residents of the countries indicated— Canada Great Britain	\$ 2,621,522 7,050	\$ 767,400	\$ 3,388,922 7,050
United States	2,214,348	668,341	2,882,689
Total	4.842,920	1,435,741	6,278,661

### Capital Invested in the Petroleum Industry in Canada in 1921, by Provinces

		-3	

	Ontario	Alberta	Total for Canada
	\$	8	
Lands, buildings, plant machinery and tools	1,797,746 19,766 44,710	1,111,968 19,997 219,972	2,909,714 39,763 264,682
Total investment	1,862,222	1,351,937	3,214,159

### Salaried Employees in the Petroleum Industry in Canada during 1921, by Provinces

TABLE 303

	Or	ntario	Alberta Total for Canada			ada	
	Num- ber of Em- ployees	Total Salaries	Number of Employees	Total Salaries	Empl	ber of loyees Female*	Total Salavies
6		\$		8			\$
Superintendents, managers, etc. Technical employees, en-	7	11.930	6	16,858	10	3	28,788
gineers, surveyors, chem- ists, draughtsmen, etc Clerks, stenographers, etc	1 2	772 970	3	1,349	1 3	2	775 2,319
Total	10	13,672	9	18, 207	14	5	31,87

<sup>\*</sup>In Alberta only.

## Time in Operation, Work done and Wages paid in the Petroleum Industry in Canada during 1921, by Provinces

TABLE 304

	Onta	ario	All	erta	Total for Canada		
Month	Average number of wage earners Total wages paid		Average number of wage- earners	Total wages paid	Average number of wage- carners	Total wagas paid	
		\$		3		- 3	
January	150	13,652	13	1,311	163	14,963	
February	152	12,512	14	1,525	166	4,037	
March	150	13,433	15	1,634	165	15,067	
April	151	12,994	20	2,031	171	15,025	
May	150	12,826	23	2,675	173	15,501	
June	150	12,637	26	2,755	176	15,392	
July	150	12,547	30	3,814	180	6,361	
August	153	12,565	31	4.022	184	6,587	
September	141	11,838	29	4,189	170	6,027	
October	146	11,281	29	4,131	175	15,412	
November	137	11,016	30	3,466	167	4,482	
December	138	12,094	28	2,964	166	15,058	
Total		149,395		34,517		183,912	
Average	147		24		171		

#### Power Employed in the Petroleum Industry in Canada during 1921, by Provinces

TABLE 305

	Ont	ario	Albe	erta	Total for Canada		
Description	Number of units	Total rated H.P.	Number of units	Total rated H.P.	Number of units	Total rated H.P.	
Boilers— Fired by hand Fired mechanically	4	130	3 6	100 340	7 6	230 340	
Stationary engines— Steam Gas. Oil		80 540 38	3 1	95 8	6 64 5	175 548 38	
Electric motors— Alternating current Direct current	39 15	337 173 Total capacity			39 15	337 173 Total capacity	
Generators or Dynamos— Direct current	5	K.V.A.			5	K.V.A.	

## Miscellaneous Expenses in the Petroleum Industry in Canada during 1921, by Provinces

TABLE 306

	Ontario	Alberta	Total for Canada
		\$	\$
Cost of purchased power	18,013 58,379 7,463	899	18,013 59,278 7,463
Faxes— Municipal Provincial Federal All other sundry expenses	6,011 872 15,733 27,146	114 1,064	6, 124 1, 930 15, 731 27, 725
Total miscellaneous expenses	133,617	2,660	136,27

### Oil Wells in Canada, 1920 and 1921

TABLE 307

	New Bruns- wick	Ontario	Alberta	British Columbia	Total
Productive wells at beginning of year	6 7	3,139 3,015	5 5		3,150 3,027
Number of wells drilled		56 9	6	4	67 10
Number of wells abandoned		353 113	1	2	359 114
Number of productive wells at end of year1920		3,015 2,997	5 5		3,027 3,009

## Summary Statistics relating to the Petroleum Industry in Canada, 1917-1921

FEN				
- 1	ars	LE	+3%	103

Year	Number	Average	Salaries	Total
	of	number of	and wages	value of
	operators	employees	paid	production
1917	168 153 120 122 120	270 264 274 202 190	\$ 167,205 195,141 210,936 182,787 215,791	\$ 542,239 885,143 736,324 822,235 641,533

#### SALT

The production of salt in Canada is from the salt wells located in the counties of Essex, Huron, Lambton and Bruce in Ontario, and from the salt mine at Malagash, Cumberland county, Nova Scotia.

Twelve firms, operating thirteen salt works, reported activity during the year 1921. Two of these plants were engaged principally in the production of brine for use in the manufacture of caustic soda and soda ash in the chemical works of the producing companies.

Where possible, comparative data for the years 1920 and 1921 have been given in the following tabulation:—

### Distribution of Ownership of Producing Companies in the Salt Industry in Canada, 1921

PY	A	_	_	_	9	n.	O.
м	. А	В	L	E	Ů.	U	

	Number		Dist	ribution of	Ownership				
Province	of plants	Par Value of Stocks and Bonds issued by Incorporated Companie and held by Residents of Countries Indicated							
		Security	Canada	Great Britain	United   States	Other Countries	Total		
Nova Scotia	1 10 1	Stocks Bonds Stocks					\$ 1,700,98 *743,00 150,00		
Total	12	Stocks Bonds	1,469,080	76,600	305,300		1,850,98 *743,00		

<sup>\*</sup>Distribution by countries not known.

### Capital Invested by Producing Companies in the Salt Industry in Canada in 1920 and 1921

η	9	À	m	9	E	2	1	n
- A	, ,	٨	25	I.	r Er	U	1.	U

Assets	1920	1921
	\$	\$
Lands, buildings, machinery and tools.  Materials on hand, stocks in process, finished products, fuel and supplies on hand.  Cash. trading and operating accounts and bills receivable.	1,396,411 553,693 271,502	1,417,078 452,746 397,884
Total	2,221,606	2,267,708

### Number of Employees, Work done and Wages paid in the Salt Industry in Canada during 1921

TABLE 311

THE PROPERTY OF THE PARTY OF TH		number oloyees	Days Wo	Total wages	
	Males Females Male		Males	Females	paid
					5
January	229	28	4,655	561	22,528
February	225	31	4,590	596	21,627
March	247	30	6,400	840	31,487
April	241	31	5,007	652	25,040
May	252	31	6,256	823	30,673
June	253	30	6,349	784	30,202
July	253	33	5,513	728	24,953
August	250	30	5,450	695	26,737
September	268	34	6,106	849	30,117
October	255	33	5,524	712	25,525
November	240	32	5,761	771	27,947
December	227	42	5, 128	770	23,667
Total			66,739	8,781	320,503
Average	245	32	272 days	274 days	\$4.24 per
			per year	per year	day

## Salaried Employees in the Salt Industry in Canada during 1920 and 1921 Table 312

THE PARTY OF THE P		1920		1921		
	Num Empl	ber of oyees	Total		ber of oyees	Total
	Male	Female	Salaries	Male	Female	Salaries
			\$			\$
Salaried officers of corporations. General superintendents and managers. Technical experts, engineers, chemists, accountants.	13		38,471	3 15 9	1	8,200 38,528 17,960
Clerks, stenographers, salesmen and other salaried employees	20	13	34,627	18	7	26,641
Total	33	13	73,098	45	8	91,329

### Average Number of Wage-earners in the Salt Industry by Months in 1920 Table 313

Month	Nun	nber	Month		nber
Month	Male	Female	Month	Male	Female
January February March April May June	258 263 283 281 272 267	29 30 34 30 31 30	July August September October November December	276 272 257 269 248 232	32 26 26 28 24 22

Total number of days in	operation during 1920.	1,791
Total wages paid during	1920	\$372,369

## Number of Wage-earners in the Salt Industry in Canada, classified by sex and according to their weekly rates of pay, 1920 and 1921

TABLE 314 16 Years of Age and Under 16 Years of Total employees Male Female Male Female 1920 1921 1920 1921 Under \$5..... \$5 but under \$10 4 8 1 18 i 36 16 \$10 \$15 24 6 30 30 \$15 1920 \$20. 9 81 37 90 \$20 \$25 1920 37 91 91 \$30 76 45 \$25 76 45 \$30 \$35 29 29 \$40 \$35 1921 \$40 \$50 and over 1921 1920 19 33 6 189 1921

### Fuel Consumed in the Salt Industry of Canada during 1920 and 1921 $_{\rm TABLE\ 315}$

Kind	Year	Unit	Tota	Total	
ixind		measure	Quantity	Cost	
Diam's Co. I				\$	
Bituminous Coal— Slack	1920	Short tons	73,876	512,382	
	1921	44	58, 592	396,514	
Lump.	1920	66	1,760 2,343	18,022 21,351	
Coke	1920		336	161	
	1921	46			
Gasoline	1920 1921	Imp. gal.	1,450	696	
Oil (fuel)	1920	44		OBC	
	1921	"	2,400	600	
Wood	1920	Cord	268 245	1,313	
Other fuel (steam)	1921 1920		240	2,226	
	1921			105,627	
Total	1920			531,880	
	1921			527, 013	

Power Employed in the Salt Industry in Canada during 1920 and 1921
Table 316

Kind	Number	of Units	Rated Horse Power		
And	1920	1921	1920	1921	
Boilers— Fired by hand	27	19 15	} 6,010	3,655 3,350	
Engines— Steam Steam turbines Oil Gasoline.		14 1 1 4	430	399 25 20 19	
Electric Motors— Alternating current. Direct current. Generators or Dynamos—	29 3	29 2	442 15	443 51	
Direct current		2		90 K.V.A Capacity cu. ft. per minute free air 930	

## Miscellaneous Expenses in the Salt Industry in Canada in 1920 and 1921 TABLE 317

	1920	1921
	\$	8
Rent of offices, works and machinery	2,476	2,539
lost of purchased power	70,326	8,711
nsurance (premium for the year, only)	18,983	26, 154
Municipal	9,990	3, 108
Provincial	1	5,735
Federal		28,351
Royalties, use of patents, etc		360
dvertising expenses	28,497	25,769
ravelling expenses.	7,146	15, 161
Repairs to buildings and machinery		89,742
All other sundry expenses	155.755	175,501

### Summary Statistics relating to the Salt Industry in Canada, 1917-1921 TABLE 318

Year	Number	Average	Total	Total
	of	Number	Salaries	Value
	Operating	of	and Wages	of
	Firms	Employees	Paid	Production
			\$	S
1917	10	309	249,073	1,047,792
1918	9	302	286,781	1,285,039
1919	11	329	350,141	1,397,929
1920	12	345	472,031	1,544,724
1921	12	277	411,832	1,673,685

### List of Producing Companies in the Salt Industry in Canada, 1921

Name	Address	Location
Ltd. The Wingham Salt Works The Western Salt Co., Ltd	719 Sandwich St. W., Windsor, Ont. Exeter, Ont Warwick, Ont Toronto, Ont Wingham, Ont 43 Victoria St., Toronto, Ont	Exeter, Huron County, Watford, Lambton County, Goderich, Huron County, Wingham, Huron County, Courtright, Lambton County.
Ontario People's Salt and Soda Co., Ltd. The Dominion Salt Co., Ltd Goderich Salt Co., Ltd Saskatchevan— Senlne Salt Co., Ltd	Kincardine, Ont	Kincardine, Bruce County.  N. Front St., Sarnia, Lambton County. Goderich, Huron County.  T.w. 39, Range 25.

#### MISCELLANEOUS NON-METALLIC MINERAL INDUSTRIES

### Capital Employed in the Miscellaneous Non-metallic Mineral Group, in Canada, 1921

TABLE 319

Industry	Lands, Buildings, Plint Machinery and Tools	Cost of All Materials on Hand, Supplies, Finished Products and Ore on Dump	Cash, Trading and Operating Accounts and Bills Receivable	Total Capital Employed
	8	\$	\$	\$
Fluorspar. Grindstones. Iron oxides. Magnesite. Quartz. Talc. Other non-metallics!	138,399 216,390 175,630 1,958,533 607,779 428,053 2,007,053	6,791 15,000 28,678 152,694 63,424 27,596 371,236	18,067 55,603 3,259 40,000 272,015 31,394 20,453	163, 257 286, 993 207, 567 2, 149, 227 943, 238 487, 073 2, 398, 742
Total	5, 529, 837	665,419	440,791	6,636,097

<sup>&</sup>lt;sup>1</sup> Includes actinolite, barytes, chromite, corundum, magnesium sulphate, manganese, mineral waters, pyrites, sodium sulphate and tripolite.

### Salaried Employees in the Miscellaneous Non-metallic Mineral Group, in Canada, 1921

TABLE 320

Industry	Superintendents and Managers	Technical Employees	Clerks and Steno- graphers	Total
Fluorspar         No.           Grindstones         Salaries \$           Iron oxides         Salaries \$           Magnesite         No.           Salaries \$         No.           Salaries \$         No.           Salaries \$         Salaries \$           Tate.         No.	9,798 2 4,800 7,550 4 8,866 3	3,600 6,000	1 742 1 900 3 3,856 3 4,611 2	$\begin{array}{c} 4\\4,661\\7\\10,540\\3\\5,700\\10\\15,006\\8\\19,477\\5\end{array}$
Other non-metallics! Salaries \$ No. Salaries \$ Total. No. Salaries \$	31, 133 35	4, 135 7 14, 635	2,825 7 9,176 17 22,110	19,725 22 44,444 59 119,553

<sup>&</sup>lt;sup>1</sup> Includes actinolite, barytes, chromite, corundum, magnesium sulphate, manganese, mineral waters, pyrites, sodium sulphate and tripolite.

Average Number of Employees, Days Work Done and Wages Paid by Months, in the Miscellaneous Non-metallic Mineral Group, in Canada, 1921

Table 321

Month	Fluor- spar	Grind- stones	Iron Oxides	Magne- site	Quartz	Tale	Other Non- Metallics <sup>1</sup>	Total
anuary	00		-	101				
Average number of employees	2.524	8 215	25 578	124 2,876	1.768	132	360 5,274	684
Days work done	10,215	644	3,269	11.977	7.689	563	28,467	13,367
ebruary—							20,301	06110
Average number of employees	72	4	25	177	72	22	324	690
Days work done	2,034 6,927	101 316	596 3,269	4,075	1,844	475	4,041	13,160
darch—	0,324	910	3,209	13,319	8,428	2,181	25,612	60,05
Average number of employees	65	7	21	63	79	30	354	619
Days work done	2.024	180	546	1,576	2.231	776	5,034	12,36
Wages paid	7,619	538	3,110	6,679	8,908	3,201	22,956	33,01
April		0.7	0.0		0.0	200		
Average number of employees		27 503	37	43 996	1,596	31)	359	588
Dnys work done		1.571	853 3,872	5,120	6,978	750 3,356	5,078	9,77
lav-		1,011	13;130.4	0,160	0,010	0,000	24,242	45, 131
Average number of employees		76	38	27	68	36	360	60
Days work done		1,861	949	519	2.048	906	3.865	10.148
Days work done		5.717	3.793	2,309	8,959	4,151	20.096	45.02
une-					.,,,,,,	.,	20,000	10,000
Average number of employees		124	38	28	120	45	343	698
Days work done		3,119	883	842	3,181	1,098	4,272	13,393
ulv—		9,491	3,426	3,753	13,548	4,827	19,780	54,821
Average number of employees		106	29	64	162	48	343	75
Days work done		2,766	766	762	3.391	1.180	4.335	13.200
Days work done		8,463	2,938	3,013	14,433	5,259	20,249	54,35
August								
Average number of employees		99	20	56	76	53	286	59
Days work done. Wages paid \$		2,605 8,066	549 2,072	959 3.755	2,036	1,344	3,228	10,72
Ceptember -		8,000	2,012	3,733	8,561	5,875	16,874	45,20
A verage number of employees		79	24	43	85	39	237	50
Days work done		1.399	608	. 806	2.042	972	1,952	7.77
Days work done		4,349	2.271	3,228	8,202	4.223	8,962	34,23
etober								
Average number of employees		34	27	66	86	38	198	449
Days work done		857 2.707	706	1.771	1,605	980	1,589	7,50
November—		2,107	2,718	6,518	6,980	4,189	7,146	30,25
Average number of employees		30	32	77	76	33	189	43
Days work done		617	799	1,959	1,833	854	1,503	7.56
Days work done		1,980	3,312	7.120	7,042	3,773	6,450	10,67
December-		10	0.0	011		20		
Average number of employees		268	26 692	83 1,896	1,541	32 787	188	393
Days work done		803	2,973	6.859	5,044	3.380	1,166 5,138	6,356 94,193
Professional Contraction of the		(,00	21010	0,000	0,041		0,100	- AT, 130
l'otal			HE STORY					
Average number of employees,	77	50	29	71	86	34	312	659
Days work done	6,582	14,491	8,525	19,034	25,116	10,254	41,335	125,33
Wages paid\$	24,761	44,645	38,993	73.650	104,772	44,978	205,972	535.771
bare work done nor man	85	290	294	268	298	302	144	
Days work done per man	3-76	3.08	4-34	3.34	4 · 14	302 4·39	133	

Includes Actinolite, Barytes, Chromite, Corundum, Magnesium Sulphate, Manganese, Mineral Waters, Peat, Pyrite Sodium Sulphate and Tripolite.

### Fuel Used in the Miscellaneous Non-metallic Mineral Group, in Canada, 1921

TABLE 322

TABLE 322	1			
		Indu	stry	
	Fluorspar	Grindstones	Iron oxides	Magnesite
Coal—Anthracite—    Short tons.   \$   Value.   \$   \$   \$   \$   \$   \$   \$   \$   \$	511 4,562		85 1,120	
Short tons		555 5,276	815 7,009	2,16 19,50
Gasoline— Imperial gallons		236 130	3,000 1,020	24 8
Imperial gallons	43,220 8,583	763 164	• • • • • • • • • • • • • • • • • • • •	
Cords. Value. \$		150 667	1,655 8,415	73 2,45
Total Value \$	13, 145	6.237	17.564	22,03
	1	Industry		
	Quartz	Talc	*Other non- metallics	Total

		Inquistry		
	Quartz	Talc	*Other non- metallics	Total
Coal—Anthracite— Short tons. Value\$			2,550 15,747	3,146 21,429
Coal—Bituminous— Short tons. Value\$ Gasoline—	1,661 13,745	167 1,565	926 14,014	6,296 61,110
Imperial gallons.			320 160	3,796 1,392
Wood-			20,864 4,551	64,847 13,298
Cords	319 1,530		1,200 4,504	4,057 17,569
Total Value\$	15,275	1,565	38,976	114.798

<sup>\*</sup>Ircludes actinolite, barytes, chromite, corundum, magnesium sulphate, manganese, mineral waters, pyrites, sodium sulphate and tripolite.

## Power Employed in the Miscellaneous Non-metallic Mineral Group, in Canada, 1921

TABLE 323

	Boilers	Stationary Engines			Electric Motors		D.C.	Locomotives		Air
Industry	fired by hand	Steam	Oil	Gas		Direct Current	Gener-	Gasoline	Steam	Com-
Fluorspar	380	3 320 9			2 95	3 20	30			
Rated H.P. Iron oxides	565 1	315	40		4					
Magnesite Rated H.P. No. of Units Rated H.P.	15	5 75		3 18	127 27 1,230			28	2	4
Quartz. No. of Units Rated H.P. Talc. No. of Units	950	300	2 56		9 185 14		155			4
Rated H.P. Other non-metallics. No. of Units	80 12 1,067	24 1,068	3	1 3	590 20 672		5 111	1 30		
Rated H.P Total for group, No. of Units	36	43	6	4	76	3	8	3	2	1
Rated H.P.	3,132	2,078	233	21	2,899	20	296	58		

<sup>&#</sup>x27;Includes actinolite, barytes, chromite, corundum, magnesium sulphate, manganese, pyrites, sodium sulphate, and tripolite.

## Miscellaneous Expenses in the Miscellaneous Non-metallic Group in Canada, 1921

Table 324

	Industry							
	Fluorspar	Grind- stones	Iron Oxides	Magne- site	Quarts	Tale	Other Non- metallics 1	Total
Cost of purchased power. Cost of all materials and supplies		6,552	3,120 16,991	\$ 5,169 55,964	\$ 2,808 75,155	8 14,166 17,585	\$ 7,335 69,486	\$ 32,634 253,733
Royalties paid  Municipal  Provincial  Federal	54	304 106 556	370	643 1,633 2,056 550	2,277 183 666 2,682	16,962 431 5,017	1,850 558 21,193 40	21,732 3,109 5,442 8,845
All other sundry expenses	3,226	5,018	11,584	89,081	52,145	11,446	37,068	209,568
Total miscellaneous expenses	15,316	12,533	32,065	155,096	135,916	65,607	118,530	535,063

Includes actinolite, barytes, chromite, corundum, magnesium sulphate, manganese, pyrites, sodium sulphate, and tripolite.

## Firms Reporting Shipments in the Miscellaneous Non-metallic Mineral Group in Canada, 1921

Address Ont	Madoe Township.
, Ont	Madoe Township.
, Ont	Madoe Township.
B.C	Grand Forks Division.
uro, N.S	Woodburn.
lle, N.B	Stonelraven.
ville, N.B	Quarryville.
liam St., Montreal, Que	Point du Lac. St. Maurice Co. Red Mill, Champlain Co. Champlain, Champlaia Co.
oodland Drive, Vancouver,	Alta Lake, Mons.
ank of N.S. Bldg., Montreal,	Harrington Township.
ard of Trade Bldg., Mont-	Grenville Township.
ul. Que	
anadian Credit Men's Trust	Clinton Mining Division.
J. O'Brien Ltd., Ottawa Imond, P.Q	Buckingham Township.
	urn, N.S

Name	Address	Location		
- Ltd.	Canada Life Building, 46 King St., West, Toronto, Ont	District of Algoma. (East Nee-bish Quarry).		
Mond Nickel Co., Ltd., The Orser-Kraft Feldspar, Ltd Wright & Co British Columbia— Granby Consolidated M. S. &	960 Queen St., Sault Ste. Marie, Ont	Dill Township. Neelon Township. Bathurst Township. Deroche Township.		
Talc— Ontario— Asbestos Pulp Co., Limited Henderson Mines, Limited Gillespie Co., Limited. Geo	Anyox, B.C  Belleville, Ontario  Madoc, Ontario  Madoc, Ontario	"Connolly Mine", Huntingdon Tp, Hastings Co. "Henderson Mine", Huntingdon Tp., Hastings Co.		
British Columbia	W. G. Dickinson, 527 Yates St., Victoria, B.C.			

#### Firms included under other Non-Metallics in Canada in 1921.

Actinolite—		
	Bloomfield, N.J.	Kaladar Township Ont
Barutes-		artification of the state of th
Brandram-Henderson Ltd	Montreal, P.Q	Lake Ainslie, Inverness County,
		N.S.
H, C, Bellew	Suite 14-6 St. Sacrament St., Montreal.	North Burgess Tp., Ont.
Corundum-	Montteat.	
	Craigmont, Ont	Raglan Township, Ont.
Graphite-		
Black Donald Graphite Co.,	Calabogie, Ont	Buonaham Tannahia Ont
Onehoe Graphite Co. Ltd	4 Fenchurch Ave., London, E.C	Lochaber Township, One.
Magnesium Sulphate-	The state of the s	and the second second
Salts & Chemicals, Ltd	44 Edward St., Kitchener, Ont	Maskakee Lake, Sask.
Basque Chemical Production		
Manaanese—	349 Railway St., Vancouver, B.C.	Basque, B.C. (near Ashcroit).
Consolidated Manganese Co	Portland, Maine, U.S.A	New Ross, Lunenburg Co., N.S.
Peat-Peat Committee (Federal-		
	Mines Branch, Ottawa	Alfred, Ont.
Pyrites— Oueboo—Weedon Mar Co. Ltd	Montreal, Que	Weedon Oue
Ontario-		
Algoma Steel Corp., Ltd	Sault Ste. Marie, Ont	Algoma District, Ont.
Grasselli Chemical Co., Ltd	Hamilton, Ont	Blythefield Tp., Ont. "Northpines Mine", Drayton Tp.,
Nichols Chemical Co., Ltd	Montreal, Que	Ont.
		"Sulphide Mine", Hungerford Tp.,
British Columbia—		Ont.
Consolidated Mining & Smelt-	Traii, B.C	"Cullings Mine" Kimbarley D.C
Smelting & Power Co., Ltd.	Anyox, B.C.	"Hidden Creek", near Anyox, B.C.
Sodium Sulphate—		
Salts & Chemicals, Ltd Sodium Sulphate Co. of Sas-	44 Edward St., Kitchener, Ont	Maskakee Lake, Sask.
katchewan Ltd.	1753 Rose St., Regina, Sask	Near Hardy, Sask.
Tripolite-		
Oxford Tripoli Co., Ltd	Oxford, N.S	Silica Lake, N.S.

# STRUCTURAL MATERIALS AND CLAY PRODUCTS INDUSTRIES

#### CEMENT

The manufacture of Portland eement in Canada was carried on during 1921, by six companies which operated thirteen plants situated in the provinces of Quebec, Ontario, Manitoba, Alberta and British Columbia. In addition to these, one company in Nova Scotia made puzzolan cement. The total daily capacity of the fourteen plants in operation was 41,942 barrels. There were also nine plants in Canada equipped for the manufacture of cement which were idle throughout the year.

Practically all the cement produced in Canada is Portland cement for which the essential elements are lime, silica and alumina. These substances are found in limestone and clay, the Trenton variety of limestone being largely used. The production of puzzolan cement, which is manufactured from blast furnace slag,

was less than 0.1 per cent of the total value of Canadian production.

The cement industry is almost entirely owned by Canadian capital. Table 325 indicates the distribution of ownership of this industry in 1921. The total par value of all securities issued amounted to \$40,628,676, of which amount \$35,116.930 or 86.5 per cent was owned in Canada. \$4,297,246 or 10.6 per cent was owned in Great Britain while the balance was held in foreign countries.

### Distribution of Ownership of the Cement Industry in Canada, 1921\* Table 325

Security	Par value of ties Issued by Reside	Total			
	Canada	Great Britain	United Stales	Other Countries	
	\$	8	8	\$	\$
Stocks Bonds Other securities	27,108,850 7,708,080 300,000	2.762,300 1,534,946		405,400	31,085,650 9,243,026 300,000
Total	35, 116, 930	4,297,246	809,100	405,400	40,628,676

<sup>\*</sup> Does not include shares of the Dominion Iron and Steel Co., Ltd.

The total capital invested as expressed by the value of lands, buildings and machinery, materials on hand, cash, trading accounts and bills receivable, amounted at the end of 1921 to \$49,160,180 as compared with a total of \$44,941,686 reported in 1920. Table 326 shows the details of the capital invested.

### Capital Invested in the Cement Industry in Canada, 1921

Танье 326	
	\$
Land, buildings and fixtures	31,893,101 4,741,607
Materials on hand, stocks in process, finished products on hand, fuel and miscellaneous supplies on hand.  Cash, trading and operating accounts and bills receivable	10.027.533 2.497.939
Total	49, 160, 180

During 1921 there were 2,751 persons employed in this industry, while during 1920, the average was 2,301. The classification of employees according to the grade of position occupied, together with the salaries and wages paid for 1920 and 1921, is shown below. It will be noted that there was a considerable decrease in the amount of wages paid during 1921, while the number of employees increased, indicating that lower wage scales prevailed, following the general tendency throughout 1921.

#### Employees, Salaries and Wages Paid in the Cement Industry in Canada, 1920 and 1921

TABLE 327

	19	20	1921	
Classes of Employees	Number of Employees		Number of Employees	
Officers, superintendents and managers. Clerks, stenographers and other salaried employees. Wage-enriers.	25 176 2,100	\$ 84,912 342,835 3,329,894	48 295 2,408	\$ 226,443 503,715 2,713,726
Total	2,301	3,757,641	2,751	3,443,884

A further classification of the total number of wage-earners employed as on December 15, for the years 1920 and 1921, respectively, according to weekly rates of pay within specified groups is presented in the next table.

# Number of Wage-earners in the Cement Industry in Canada, classified by age and according to their weekly rates of pay, as on December 15, 1920 and 1921.

TABLE 328

		1920			1921	
Weekly Wage Rate	16 years of age or over	Under 16 years	Total Employees	16 years and over	Under 16 years	Total Employees
Under \$10. \$10 but under \$15. \$15 \$20. \$20 \$25. \$25 \$30. \$30 and over.	3 27 77 737 803 918	2 6	5 33 77 737 803 918	28 33 178 732 514 670	3	2 3 17 73 51 67
Total	2,565	8	2,573	2, 155	3	2.15

The fourteen cement plants in Canada operated for a total of 2,597 days during 1921. The total number of days' work performed by wage-earners was 653,242. The time in operation, work performed and wages paid are shown by months in the table on the following page.

#### Time in Operation, Work Performed and Wages Paid in the Cement Industry in Canada, 1921

Mosili	Number of Days Plants were in	Total Num Work Per Wage-l	Total Wages		
	Operation	By males	By females	Paid	
				\$	
MINNY.	210	62,649	772	273,89	
cordary	164	53,444	644	223,710	
Jarch	231	58,669	524	249, 28	
April		63,711	670	275,960	
lay		68, 295 63, 763	1,046	290,79 280,60	
ime	10.00.00	53,490	993	231. 18	
uly	233	43.476	1.079	192,71	
eptember	13.373	50.028	1.149	208, 403	
etober	1	46,382	985	181,00	
November		43,442	1,109	103,530	
Occamber	103	34,798	992	133, 620	
Total	2,597	642,147	11,095 ·	2,713,720	

The quantity and cost of the various kinds of fuel used in cement manufacturing during 1921 are shown by origin in Table 330. Returns from the different provinces show that the plants in Nova Scotia, Alberta and British Columbia used domestic fuel entirely, the total fuel cost in these provinces being \$252,393. In Quebec, Ontario and Manitoba the cost of foreign fuel used was \$2,534,132, only \$2,295 being paid for domestic fuel in these provinces. The industry is largely dependent on foreign fuel as coal is used almost exclusively and the majority of plants are situated in provinces where no coal is found.

Fuel Used in the Cement Industry in Canada, 1921

Kind	Unit of Measure	Quantity	Cost
			\$
Site minuse soal— Siack Run of mine		330,657 400 40	2,778,45 3,20
Limp		12,320	4.76

During 1920 the total cost of fuel used was \$3,457,796. Of this amount \$119,549 was spent for domestic fuel and \$3,338,247 for foreign fuel.

The power equipment used in this industry for 1921 is shown in Table 331.

### Power Employed in the Cement Industry in Canada, 1921 TABLE 331

Class	Number of Units	Total H.P. according to manufacturer's rating
Boilers	18	3.066
Engines:		
Steam	16	2,720
Steam turbines.	1	520
Gasoline	8	135
Hydraulic water wheels	6	500
Electric motors:		
Alternating current.	988	53, 159
Direct current.	158	7,216
Generators:		FOO TT 331
Alternating current	I	500 K.W 30 K.W
Direct current	1 2	30 14, 15
Air compressors	.5	

The miscellaneous expenses connected with this industry are itemized in Table 332.

### Miscellaneous Expenditures in the Cement Industry in Canada, 1921

		8
Rent of offices, works and machinery		7.540
'ost of purchased power		559,960
nsurance (premium for the year only)		238, 091
'axes (municipal, provincial and federal)		182,086
Royalties, use of patents, etc		48.050
Advertising expenses		88, 133
ravelling expenses		17, 210
Repairs to buildings and machinery		556.78
all other sundry expenses (not elsewhere specified	b	904.163
The state of the s	-,	 
Total		9 609 096
& Witches and the second and the sec		 in a (117 in ) (7 in )

A recapitulation of the more important statistics pertaining to the cement industry is given below for the years 1920 and 1921.

### Summary Statistics of the Cement Industry in Canada, 1920 and 1921 Table 333

	1920	1921
Number of active plants	13	1.
Capital employed. Salaried employees.	\$ 44,941,686	\$ 49,160,18
Salaries paid Average number of wage-earners	\$ 427,747	\$ 730,15 2,40
Wages paid	\$ 3,329,894	\$ 2,713,72
Fuel cost	\$ 3,457,796 \$ 1,738,152	\$ 2,788,82 \$ 2,602,02
Value of products sold or used	\$ 14,798,070	\$ 14,195,14

#### List of Plants Operating in the Cement Industry in Canada in 1921

Nova Scotia-

Dominion Iron and Steel Co., Sydney.

Quetec-

Caunda Cement Co., Ltd., Head Office—Phillips Square, Montreal, Que. Plants—Montreal East; Hull.

Ontario-

Canada Cement Co., Ltd. Mill No. 4, Belleville; Mill No. 5, Belleville; Port Colborne.

Hanover Portland Cement Co., Ltd., Hanover. St. Mary's Cement Co., Ltd., St. Mary's.

Manitoba-

Canada Cement Co., Ltd., Tuxedo. Commercial Cement Co., Ltd., Babcock.

Alberta

Canada Cement Co., Ltd., Exshaw, Marlboro Cement Co., Marlboro.

British Columbia-

British Columbia Cement Co., Ltd., Head Office—305 Belmont Bldg., Victoria, B.C., Plants—Bamberton: Tod Infet.

#### CLAY PRODUCTS

The production of clay products in Canada for the past three years has been tabulated in considerable detail in another section of this report and the object of this description is a consideration of the statistics regarding the more important financial aspects and the general conditions of the industry.

The clay products industry was divided into five main groups as follows, brick and tile, clay sewer pipe, fire brick and fireclay, stoneware and pottery, and knolin and other clays. The numbers and location by provinces of the different places are shown in the subjoined table.

# Operating Establishments in the Clay Products Industry in Canada by Provinces, 1921

	Number of Establishments in Groups Indicated						
Province	Prick and Tile	Clay Sewer Pipe	Firebrick and Fireclay	Stoneware and Pottery	Kaolin and other Clays	Total for Province	
New Poetta New Drus wick Queboc Ontario Manitoba Saskatchewan Allocta Dri sh Columbia	7 4 18 136 7 7 13	1 1 3	1	2	1	11 5 21 144 7 7 15	
Total	202	5	7	4	2	220	

The total capital employed in the clay products industry in Canada in 1921 amounted to \$28,515,928 divided as follows: Lands, buildings and fixtures—\$18,820,389; machinery and tools—\$4,258,785; materials on hand, stocks in process, etc.—\$2,831,837; and cash, trading and operating accounts, bills receivable, etc.—\$1,604,917. The detail is shown by provinces in Table 336, following. In Table 335 other items of interest such as the character and distribution of

ownership and the par value of issued securities is shown by groups. The brick and tile industry was of outstanding importance in comparison with the others in the group.

### Distribution of Ownership of the Clay Products Industry in Canada, 1921 Table 335

	Di	stribution	of Ownersh	nip
Industry			panies and	Held by
	Canada	Great Britain	United States	Total
Brick and tile Clay sewer pipe Firebrick and fireclay Stoneware and pottery Kaolin and other clay. products	100,000	117.000	163,200 325,000	\$ 15,609,326 2,344,333 1,352,400 100,000 2,034,100
Total	19,505,891	353,488	1,580,780	21,440,150

# Capital Employed in the Clay Products Industry in Canada, by Provinces, 1921

TABLE 336		1741			
	Land, Buildings and Fixtures	Machinery and Tools		Cash, Trading and Operating Accounts and Bills Receivable	Total
Brick and tile— Nova Scotia. New Brunswick. Quebec. Ontario. Manitoba. Saskatchewan. Alberta. British Columbia.	\$ 687,072 36,400 5,808,025 5,333,158 342,828 614,054 906,615 541,212	\$ 370,678 22,840 307,013 1,964,955 183,200 274,572 277,087 182,343	\$ 33, 176 12, 025 386, 377 1, 037, 204 134, 333 74, 005 214, 889 120, 266	\$ 81,296 3,006 183,918 727,505 61,245 24,646 53,974 138,198	1,172,222 74,271 6,685,333 9,062,822 721,606 987,277 1,452,565 982,019
Total for Canada	14.269,364	3,582,688	2,012,275	1,273,788	21, 138, 115
Clay sewer pipe— Total for Canada	2,099,896	424,534	530,738	121,868	3,177,036
Firebrick and fireclay products— Total for Canada	1,060,921	226,319	218,357	137,525	1,643,122
Stoneware and pottery— Total for Canada	113,746	25,244	67,587	68,688	275, 265
Kaolin and other clays— Total for Canada	2, 276, 462		2,880	3,048	2, 282, 390
Total for clay and clay products— Nova Scotia New Brunswick. Quebec. Ontario. Manitoba. Saskatchewan Alberta. British Columbia	1,113,633 47,431 8,595,137 7,168,372 342,828 614,054 1,397,722 541,212	451,684 25,840 475,566 2,341,413 183,200 274,572 324,167 182,343	133, 924 24, 379 520, 717 1, 416, 459 134, 333 74, 005 407, 754 120, 266	89, 288 8, 649 226, 080 917, 809 61, 245 24, 646 139, 002 138, 198	1,788,529 106,299 9,817,500 11,844,053 721,606 987,277 2,268,645 982,019
Total for Canada	19,820,389	4,258,785	2,831,837	1,604,917	28,515,928

The most important information with respect to conditions of employment and amounts paid for helpers is shown in the following tables. The data are shown for the whole clay products industry in Canada.

Of the 288 people engaged as salaried officials, 262 were males and 26 were females; \$582,760 was paid to these officials during 1921 or an average yearly

salary of about \$2,024.

With regard to the wage-earners, a much smaller proportion were female workers whose earnings generally ranged from \$10 to \$15 per week. The wages paid to men ranged from \$20 to \$25 per week, although lower and higher wages were also paid to smaller numbers of the workers. For the whole of Canada, the average daily wage for all workers was \$4.064 per day, there having been a total of 784,279 days' work performed for which \$3,187,493 was paid. Similar information may be had for each province by consulting the data in the subjoined table.

#### Average Yearly Salaries and Daily Wages Paid in the Clay Products Industry during 1921, by Provinces

					-
- 1	JA 15	13			2
3.	1.98	182		w	

Province	Total No. of Salaried Employees	Total Salaries	Average Yearly Salary	Number of Days' Work Performed by all Wage-Earners (a)	Total Wages Paid (b)	Average Daily Wage*
Nova Scotia	10	\$ 29, 262	\$ 2,926	37,232	\$ 135,447	\$ 3.64
New BrunswickQuebec	34	3,500 77,503	1,166	12,874 127,170	37, 461 514, 380	2·9 4·04
Ontario	154 21	310,877 44,242	2,018 2,107	439,025 23,620	1,762,577 108,049	4 · 05 4 · 57
Saskatchewan	12 31 23	15, 915 61, 226 40, 235	1,326 1,329 1,749	15,463 84,239 44,656	77,829 365,898 185,852	5 · 03 4 · 34 4 · 16
Total	288	582,760	2,024	784.279	3, 187, 493	4.00

<sup>\*</sup> The quotient from (b) divided by (a).

# Salaried Employees and Salaries Paid in the Clay Products Industry in Canada, 1921

Table 338

Occupation	Male	Female	Salaries	
Salaried officers of Corporation.  General superintendents or managers.  Technical experts, engineers, chemists, accountants, etc.  Clerks, stenographers, salesmen and other salaried employees.	90 30	3 1 22	\$ 216,996 208,259 52,095 105,410	
Total.,,	262	26	582,760	

# Work Performed and Wages Paid in the Clay Products Industry in Canada, 1921, by Months

TABLE 339

Measth	Total Numb Work Perfo Wage E	Total	
	Male	Female	Wages
january February March April May June July August September October Neyneber December	38,347 53,027 83,670 100,567 97,208 94,776 80,216 68,331	467 574 672 768 788 885 818 825 771 710 634 605	\$ 123,746 131,736 131,736 166,087 226,974 342,295 411,045 392,950 378,785 317,985 278,659 222,116 195,115
Total	775,762	8,517	3, 187, 493

# Classification of Wage-earners in the Clay Products Industry in Canada, according to Sex, and Weekly Rates of Pay, 1921

TARLE 340

Weekiy Wase		s of age	Under of	Total	
WESKIN WATE	Male	Female	Male	Female	Emplayees
Under \$5 \$5 but under \$10 \$10 but under \$15 \$15 but under \$20 \$20 but under \$25 \$25 but under \$30 \$30 but under \$35 \$35 but under \$40 \$40 but under \$45 \$45 but under \$45 \$45 but under \$50 \$50 und over.	42 87 305 1,024 1,453 882 320 81 44 13 3				48 117 352 1,033 1,454 883 320 81 44 13 3
	4,254	38	56		4,348

# Quantity and Value of Fuel Used in the Clay Products Industry by kinds in Canada, 1921

Table 341

Kind	Unit of Measure	Quantity	Cost delivered
Bituminous coal, slack Bituminous coal, lump. Bituminous coal, run of mine. Anthracite coal, lump. Anthracite coal, dust or slack Lignite coal, slack. Lignite coal, lump. Lagnite coal, run of mine. Coke. Gasoline. Oil (fuel). Weoul. Cas	Short ton  ""  ""  Imp. Gal.  Cord 1,000 cu. ft.	24, 208 98,711 27,472 1,042 898 4,085 5,738 620 5,029 51,116 56,214 810,303	\$ 191, 938 944, 797 249, 689 10, 852 4, 514 13, 444 11, 404 1, 506 7, 680 1, 924 7, 164 334, 913 30, 122 2, 285
Total			\$1,812,232

#### MINERAL PRODUCTION OF CANADA

Power Employed in the Clay Products Industry in Canada Table 342

Class	Number of units	DIR
Fired by hand. Fired mechanically	177	11.
Hagines— Steam Gas Oil Gasoline	125 13 9 10	\$,053 328 381 75
H retraulic turbines or water wheels	1	90
Alternating current.  Direct current.	342 26	12, 24; 87(
Other power	2	Total capacity
Generators or Dynamos— Alternating current. Direct current.	2 7	345 K.W. 411 K.W.

### Miscellaneous Expenses in the Clay Products Industry in Canada, 1921

Rent of offices, works and machinery	138, 985
Cost of purchased power	150,031
Issurance premium (for the year only)	130, 402
Taxot — Manicipal	85,961
Provincial	24, 297
Federal\$	65, 608
hiovalties, use of patents, etc	15,608
Also seriasing expenses\$	27,631
Tracelling expenses	47.435
Repairs to buildings and machinery	387, 172
All other sundry expenses\$	577.319
The state of the s	010, 1010
Total\$	1 050 110
1.0644	1,000,449

### LIME BURNING IN CANADA, 1921

Of the 66 time burning plants operated in Canada, 1 was located in Nova Scotia, 5 in New Brunswick, 17 in Quebec, 34 in Ontario, 4 in Manitoba, 3 in Alberta and 2 in British Columbia. These plants were controlled and operated by 58 separate owners. The total capital employed amounted to \$4,990,969. The total value of the securities issued by the joint stock companies carrying on lime burning as an independent enterprise was \$3,171,484. The issued common stocks was \$3,149,900; bonds amounted to \$3,601, and par value of the securities of other kinds totalled \$17,983. Of this total, \$1,924,434 or 60 per cent was owned by residents of Canada, \$1,203,450, or 38 per cent, by residents of the United States, and the balance \$43,600 in Great Britain. The detail is shown by provinces in the accompanying tables (344) and (345).

There have not been included in the foregoing record any data regarding the several large industries such as those producing cyanamide, refining sugar, etc., by which lime burning is carried on as a subsidiary industry contributing raw materials for further use in the same or related plants. In the commodity

statistics, the total output from all plants was given.

#### DOMINION BUREAU OF STATISTICS

# Ion of Ownership of Securities Issued by the Incorporated Companies in the Lime Industry in Canada, 1921

ALC: NO.	Distribution of Ownership.  Total Par Value of Securities Issued by Incorporated Companies and Held by Residents of the Countries Indicated.							
Proriate								
	Security	Canada	Great Britain	United States	Total			
New Brunswick. Quebec. Ontario.  Manitoba. Alberta. British Columbia.	Stocks Stocks Stocks Bonds Other Securities Stocks Stocks Stocks	\$ 168,300 416,550 671,600 3,601 17,983 570,300 74,600 1,500	\$ 10,700 32,900	42,000	\$ 168,300 551,000 680,100 3,601 17,983 623,000 127,500 1,000,000			
Canada	Stocks	3,601		1,203,450	3,149,900 3,601 17,983			
Cotal	(WALLSTON)	1,924,434	43,600	1,203,450	3, 171, 484			

### Capital Employed in Lime Burning in Canada, 1921

	New Brunswick	Quobec	Ontario	Manitoba	Alberta	British Columbia	Canada
	s	s	\$	s	8	\$	8
ds, buildings and fixtures.  Machinery and tools.  Macrials on hand, stocks in mocess, finished products in hand, fuel and miscella-		744,857 199,147	1,046,956	435,003		1,042,023 300	
neous supplies on hand	47,718	112,295	108,629	63,727	8,865	79,133	420,36
Cash, trading and operating accounts and bills receivable		152,008	241,321		23,605	70,723	497,81
Total	228,738	1,208,307	1,582,715	510,458	268,572	1, 192, 179	4,990,96

As might be expected, the number of salaried officials and the amount of calaries paid in this industry is small when compared to the value of the product made. This is due to the impossibility of making a complete separation of all those engaged, and many of them are necessarily included in other industries. There were in Canada some 87 salaried officials, 72 of whom were males and 15 females, who received salaries totalling \$131,152. On the other hand, those engaged in labour such as quarrying and working at the kilns received during the year a total of \$818,814 for 243,739 days' work or an average of about \$3.36 per day.

#### Salaried Employees and Salaries Paid in the Lime Industry in Canada, 1921

TABLE 346

Occupation	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Total for Canada
Salaried officers of corp.—	1	10	10				2
Female	\$1,000	\$4,740	\$22,286				\$28,02
General supts., managers	\$3,400	\$19,800	12 \$23,045	\$3,900	\$5,000	\$13,500	\$68,64
Salary Technical experts, engineers, chemists, accountants, etc.	60, 100	910,000	920,040	60, 500	\$7,000	\$10,000	6x10, U1
Male	\$300	\$4,400	\$1,000	\$1,800			\$7,50
lerks, stenographers, sales- men-							
Male	2 1	6 4	4 4	1		3 4	1
Salary	\$1,045	\$7,889	\$5,978	\$1,200		\$10,869	\$26,98
Male Female	6	26 4	27 6	4	2	7	7
Salary	\$5,745	\$36,829	\$52,309	\$6,900	\$5,000	\$24,369	\$ 131,15

### Labour Statistics of the Lime Industry in Canada, 1921, by Provinces Table 347

Province	Average No, of men employed	Days work done	Wages	Average daily wage
		177	8	8
New Brunswick	102	26,820	91.096	3.40
Quebec	187	54,100	174,460	3-25
Ontario	366	100,862	341.826	3.39
Manitoba	48	13,445	57.198	4 - 23
Alberta	19	4,573	17.920	3.92
British Columbia	122	43,939	136,314	3-10
Total for Canada	844	243,739	818.814	3.3

A classification
Table 348. Of the
293 from \$20 to \$25
130 more than these nor were females reported as being on the payrolls.

A classification ders according to weekly earnings is given in yees, 350 received from \$15 to \$20 per week and yees, 350 merceived less and yees. None under 16 years of age were employed, nor were females reported as being on the payrolls.

# Number of Wage-earners in the Lime Industry in Canada, as on December 15, 1921, classified according to their weekly rates of pay.\*

TABLE 348

Weekly wage	Number	Weekly wage	Number
Under \$5.  \$5 but under \$10 \$10	2 7 82 350 293	\$30	26 8 2 2
\$25 " \$30	92	Total	86-

<sup>\*</sup>All male employees.

The principal item among the fuels used was wood, of which 56,539 cords valued at \$307,303 was used. Bituminous coal came next with 23,629 tons consumed valued at \$241,152. Small amounts of gasoline, fuel oil and gas were also used. The data for these items are given in Table 349, and in Tables 350 and 351 following, other information concerning miscellaneous expenses and machinery installed is tabulated.

### Fuel Used in the Lime Industry in Canada, 1921

TABLE 349

Kind	Unit of Measure ·	Quantity	Value
	01 .44 -	00 000	\$ 150
Bituminous coal, slack		23.629	241,152 52,506
Bituminous coal, run of mine	- 66	6.877	55,414
Anthracite coal, lump		10	150
Anthracite coal, dust or slack		1,763	9,044
Lignite coal, lump	66	20	222
Casoline	Imp. gal.	5,859	2,201
Wood	Cord	56,989	310,003
Gas	M eu. ft.	285,440	28,240
Total cost			698.992

### Miscellaneous Expenses in the Lime Industry in Canada, 1921

	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Total of Canada
	8	s	\$	s	\$	s	\$
Rent of offices, works and machinery.	56	4,230	4,641	2,381		204	11,51:
Cost of purchased power	145	9,131	11,886	251		6,635	28,048
Insurance (premium for the year			1073				
only)	2,617	6,802	4,687	3,178	215		17,49
Taxes-							
Municipal	232	4,457	4,902		156		11,549
Provincial		1,126	2,304		11	2,440	5,88
Federal	13	4,939			459	4,338	11,09
Royalties, use of patents, etc		419	1,769			125	2,31
Advertising expenses	75	220	1,459			570	2,32
Fravelling expenses	125	1,021	3,665		1,562	3,447	19,02
Repairs to buildings and machinery	2,863	40,575	35, 109	3,730	2,707	7,877	92.86
All other sundry expenses,	26,079	61,217	106,580	6,923	4,283	431	205,51
Total value	32,205	134, 137	178,344	27, 474	9,393	26,067	407,62

### Power Employed in the Lime Industry in Canada, 1921

Class	Number of units	Total H.P. according to manufacturer's rating
Boilers— Fired by hand	35	1,543
Engines— SteamGas	27	1,181
Gasoline. Hydraulic turbines or water wheels.	6 3	73 20
Electric motors— Alternating current.	49	1,005
Direct current	36	767 Total capacity
Alternating current	2	Capacity
Air compressors	10	7,653 cu. ft. per min. free air

#### SAND AND GRAVEL

For statistical purposes, the sand and gravel industry has been divided into two parts: comprising the operations of (1) railway companies producing sand and gravel for ballast and other purposes; (2) all other producers. About two-thirds of the total output, or 7,696,866 tons, was produced by the railway companies. Only a nominal value was placed upon this production by railway companies, amounting in all to only \$1,143,925 which was almost \$250,000 less than the value placed by dealers upon the remaining one-third of the total,

The figures given in the following tables do not include the operations of railway companies except where specifically mentioned. The railway companies were not asked to furnish any statistics for this industry other than the figures for production, as, owing to the varied nature of their operations, it would have been impossible for them to give the detailed data generally required. Among the other operators in this industry, of whom there were 218 in Canada in 1921, it was often found that the production of sand and gravel was quite a subsidiary part of the business transacted. For this reason, such items as the value of stock issued, and the actual capital employed have been omitted from the present compilation. The data given for this section have been confined to such more easily computed information as the number of employees engaged, amount of salaries and wages paid, power used, and miscellaneous expenses incurred.

In order to present more compact data, a grouping of provinces according to geographical location has been adopted. The statistics for the Maritime Provinces and Quebec have been combined, Ontario is presented separately, the Prairie Provinces are grouped together and British Columbia is shown separately. A total of these four groups forming the Dominion Total for the industry is also shown in each table.

A total of 65 salaried employees receiving salaries to the value of \$104,266 was reported in 1921. There were also 590 wage-earners employed to whom total wage payments of \$350,644 were made. These totals do not represent the actual number of persons engaged in the industry as a great many of the small operators had no paid help. Also, in some instances, the labour was provided by the parties requiring the sand and gravel.

Table 352 shows the reported number of days' work done and wages paid in this industry in 1921. The number of salaried employees and salaries paid is also shown.

Labour Statistics of the Sand and Gravel Industry in Canada, 1921, by Provinces

Province	No. of salaried em- ployees	Salaries paid	Average number of wage carners	Days' work done	Wages paid	Average daily wage
N' C		\$		-	\$	\$
Nova Scotia	9	10,450	73	9,460	35,652	3.77
Quebee	36	65,473	307	55,887	228,628	4.09
Manitoba	11	14,575	174	8,789	41,855	4.76
Alberta	9	13,768	36	10,512	44,509	4.23
Total for Canada	65	104,266	590	84,648	350,644	4-14

The fuel used by the industry was mainly for power purposes in operating derricks, excavators or shovels, practically all of which were installed in Ontario. Tables 353 and 354 show the fuel used in this industry and the power employed.

Fuel Used in the Sand and Gravel Industry in Canada, 1921
TABLE 353

Kind		Nova Scotia New Brunswick, Quebec	Ontario	Manitoba, Saskatche- wan, Alberta	British Columbia	Total for Canada
Coal— Anthracite	Tons		1			1
Authorite	Value \$		16			16
Bituminous		81	4,404	154	337	4,496
	Value \$	756	35,621	1,890	3,539	41,806
Lignite						455
Coke	Value \$ Tons	( (	94	1,707		1,707
CORCIONALIA	Value \$		948			948
Gasoline		60	7,102	10		7,172
	Value \$	24	2,854	4	, , , , , , , , , , , , , , ,	2,882
Fuel oil			1,220			1,220
	Value \$		244			244
Wood	Value \$		3 38			38
Total value		789	39,721	3,601	3,539	47,641

### Power Employed in the Sand and Gravel Industry in Canada, 1921 $_{\rm TABLE~354}$

Class	Bru	Scotia, New nswick, Jehec	On	tario	Sasl	nitoba, catche- van, berta		itish Imbia		otal for mada
	No.	Rated H.P.	No.	Rated H.P.	No.	Rated H.P.	No.	Rated H.P.	No.	Rated H.P.
Boilers (all fired by hand)	4	105	19	488	7	490	1	50	31	1,133
Steam turbines	1	30	24	703 10	4	460	5	86	34	1,279
Gas			5	18	1	1	8	269	6 8	269
Electric motors— Alternating current			21	600	5	385	5	300	31	1,28
Direct current. Generators or dynamos. Air compressors.					1	280 KW	2	io KW	3	290 KW

The miscellaneous expenses in connection with this industry during 1921 are shown in Table 354.

### Miscellaneous Expenses in the Sand and Gravel Industry in Canada, 1921 $_{\rm TABLE~355}$

Kind	Nova Scotia New Brunswick, Quebec	Ontario	Manitoba, Saskatche- wan, Alberta	British Columbia	Total for Canada
Cost of purchased power	8	\$ 12,341	\$	\$ 5,400	\$ 17.741
Cost of all materials and supplies used in the pit.  Royalties paid.		68,102 24,006	19,359 3,095	19,169	108,944 27,221
Taxes— Municipal Provincial	286 89	5,553 1,146	714 66	662	6,553 1,963
Federal	513 7,839	3,455 72,147	845 12,682	5,500	4,813 98,168
Total miscellaneous expenses	11,161	186,750	36,761	30,731	265,403

#### STONE

In this report, statistics of the stone industry have been practically confined to quarrying operations and to the production of sawn or polished stone when these operations were carried on in conjunction with the quarrying. In addition to this production of stone by regular operators, there is no doubt a large stone production by individuals such as farmers and others for house or barn foundations, concrete work, etc., of which it would be impossible to obtain any satisfactory record. A large quantity of stone is also used in railway construction work and in road building. It was obviously impracticable to obtain details of these operations.

The distribution of ownership of the incorporated companies engaged in the production of stone is shown in Table 356. It will be seen that the issued stocks, bonds and other securities are held almost entirely in Canada.

Distribution of Ownership of Producing Companies in the Stone Table 356 Quarrying Industry in Canada, 1921

		Distribution of Ownership								
Province		Total Par Value of Securities Issued by Incorporated Companiand Held by Residents of the Countries Indicated.								
Province	Security	ecurity Canada		United States	Total					
		\$	2	2	3					
Nova Scotia	Stocks	25,634		2,210	27,84					
New Brunswick	Stocks	78,500		3,000	81,500					
Quebec	Stocks	3, 155, 700	160,500		3,316,200					
	Bonds	2,679,000			2,670,000					
Ontario		2,937,492		248,400	3, 185, 893					
	Bonds	106, 226		250,000	356,220					
Nr. 14 1	Other securities	22,388		0.010	22,389					
Manitoba,		15,634 65,000		2,210	17,844 65,000					
Alberta British Columbia	Stocks	260,000			260,000					
Difficult Columbia	Stocks	200,000			200,100					
Total for Canada	Stocks	6,522.326	160,500	253,610	6,936,436					
- Company C Belline Care, , , , , , ,	Bonds	2,785,226	200,000	250,000	3,035,226					
	Other securities	22,388			22,388					

The actual capital invested in this industry as represented by such assets as land, buildings, machinery, materials and products on hand, cash, trading and operating accounts, etc., is shown in Table 357, divided according to the provinces in which the quarries are located.

Capital Actually Employed in the Stone Quarrying Industry in Canada, Table 357 1921

The state of the s	Сар	Capital represented by					
Province	Lands, Buildings, Plant machinery and Tools	Cost of all materials, supplies and finished products on hand	Cash. trading and operating accounts and bills receivable	Total capital employed			
Nova Scotia. New Brunswick Quebec. Ontario Manttoba Alberta. British Columbia	\$ 1,180,113 107,593 3,652,611 3,976,992 607,457 5,000 270,782	\$ 137,648 32,227 183,981 219,658 60,000 50 6,490	\$ 57,752 30,568 281,998 310,827  600 15,688	\$ 1,375,513 170,388 4,118,500 4,507,477 667,457 5,650 202,960			
Total for Canada	9,800,548	640,054	697, 433	11, 138, 035			

Tables 358 and 359 below indicate the payments made to salaried employees and wage-earners in the industry during 1921. The average daily wage has been computed and is shown by provinces.

# Salaried Employees and Salaries Paid in the Stone Quarrying Industry in Canada, 1921

TABLE 358

Occupation	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	British Columbia	Total for Canada
General superintendents and managers— No. Male No. Female	7	5	29	27	3	2	73
Salaries	\$ 9,718	\$ 5.700	\$ 66,155	\$ 64,917	\$ 7,250	\$ 4,440	\$ 158, 180
Technical employees, engineers, chemists, accountants, etc.— No. Male			3	2	9		8
Salaries			\$ 3,585		\$ 1,500	\$ 607	\$ 11,242
Clerks, stenographers, etc— No. Male No. Female	2	, ,	23	16 8	2		41 12
Salaries			\$ 25,158	\$ 30,693	\$ 1,919	\$ 600	\$ 60,591
Total for Canada— No. Male No. Female Salaries	1	\$ 5,700	2	45 9 \$ 101,160	\$ 10,699	3 1 \$ 5,647	124 13 \$ 230,013

### Labour Statistics of the Stone Quarrying Industry in Canada in 1921, by

TABLE 359

Province	Average No. of Men Employed	Days Work Done	Wages Paid	Average Daily Wage
Nova Scotia	109	17, 067	\$ 57,340	\$ 3.3
New Brunswick	65	12,892	51.596	4.0
Quebec	925	206, 527	821,460	3.9
Ontario	809	170,322	702.507	4 - 1
Manitoba	50	10,463	43,788	4 - 1
Alberta	11	2.009	10,365	5.1
British Columbia	109	21, 122	100, 203	4 - 7
Total for Canada	2,067	440,402	1,787,259	4.0

The fuel used in stone quarrying is of small importance, the total value of all fuel used during the year being only \$141,442.

Fuel Used in the Stone Quarrying Industry in Canada, 1921
Table 360

Province			All Other	Total				
	Anthracite		Bituminous		Lignite		Fuel	Value
	Tons	Value	Tons	Value	Tons	Value	(Value)	
		\$		\$		\$	8	\$
Nova Scotia			1,134	6,026			1 * * * * 1 * * * * *	6,026
New Brunswick	22 761	231 5,558	197 4.647	2,424			600	3,255
Quebec Ontario	838	7,176	6,697	49,191 56,398			5,801 4,733	60,550 68,307
Manitoba			60	783	35	371	750	1,904
British Columbia			150	1,400				1,400
Total for Canada	1,621	12,965	12,885	116, 222	35	371	11,884	141,442

All expenses incurred during 1921 exclusive of salaries, wages and fuel costs amounted to \$2,369,130. The detail of these expenditures is shown by provinces in the following table.

### Miscellaneous Expenses Incurred in Stone Quarrying Industry in Canada, 1921

TABLE 361

	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Alberta	British Columbia	Total for Canada
	8	8	\$	8	2	3	3	\$
Cost of purchased power	2,525		69,783	74,861	4,548		651	160,368
in the quarry.	16.367		198,889	371,029		1,640		625,734
Royalties paid	553 1.138		27,081 7,240	3,349 8,085		150 11	2,323	33,927 18,797
Provincial	794	61	3.184	7,146	282	91	1,030	12,588
Federal	4,339		2,049			1 110	1,363	21.578
All other sundry expenses	13,102	4.321	124,770	1,344,006	2,749	1,113	6,077	1,496,138
Total miscellaneous expenses.	38,818	13,121	432,996	1,822,303	13,353	3.005	45,534	2,369,130

# Power Used in the Stone Quarrying Industry in Canada, 1921 Table 362

		Nova Scotia	New Bruns- wiek	Quebec	Ontario	Manitobu	British Columbia	Total for Canada
Boilers (fired by hand)	No. Rated H.P.	14 774	4 175	29	30	7	3	87
Stationary engines:	Rated H.F.	114	110	1,367	1,544	100	117	4.077
Steam	. No. Rated H.P.	7 440	120	1.025	21 1.275	6 75		54 2,935
Steam turbines				1,040	1			1,000
1	Rated H.P.				30			30
Gas	Rated H.P.	23		40	9 234		1	15
Oil		40		10	234		25	322
	Rated H.P			5	24			29
Hydraulic turbines or water wheels	Rated H.P.	80 80					600	9 680
Electric motors		00					600	080
Alternating current	No.	4		121	78	7		210
Direct current	Rated H.P.	133		5,374	3,811	320	*********	9,638
	Rated H.P.		75	507	1,887			2,469
Generators or dynamos— Alternating current	No.			2	2			4
Atternating current	Cap. KVA.			60	325			385
Direct current	. No			18			1	19
Air compressors	Cap. KW.			1,036	8		7 6	1.043
Steam shovels	. No.	2		3	13	3 1	1	41 20
Drills: (operated by) Sleam	No.	9		13	- 11	2		35
Compressed atr	No.	1	1	72	22	3	6	105
Electricity	. No.			6	23			29
Gas or oil Derricks: (operated by)	No.			1	2			3
Steam		3	1	15	3	5		27
Compressed air	. No.			5	4		********	9
Electricity				11	2			14
	,							

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